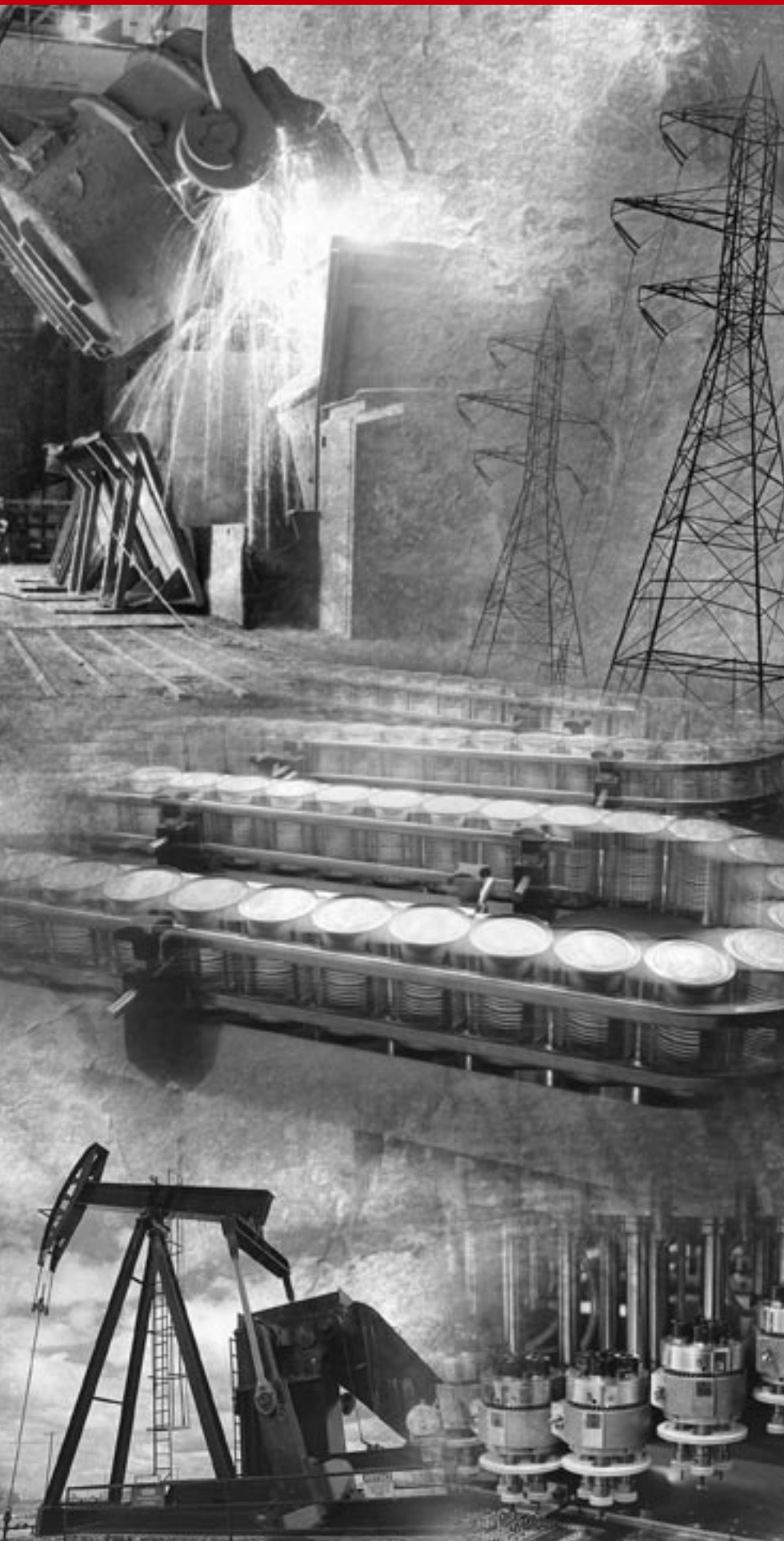




Allen-Bradley

POINT I/O DeviceNet Adapter

1734-ADN

User Manual

**Rockwell
Automation**

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Reproduction of the contents of this copyrighted publication, in whole or part, without written permission of Rockwell Automation, is prohibited.

Throughout this manual we use notes to make you aware of safety considerations:

ATTENTION



Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss

Attention statements help you to:

- identify a hazard
- avoid a hazard
- recognize the consequences

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

European Communities (EC) Directive Compliance

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet the Council Directive 89/336/EC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC — Generic Emission Standard, Part 2 — Industrial Environment
- EN 50082-2 EMC — Generic Immunity Standard, Part 2 — Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests. For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as the Allen-Bradley publication Industrial Automation Wiring and Grounding Guidelines For Noise Immunity, publication 1770-4.1.

This equipment is classified as open equipment and must be mounted in an enclosure during operation to provide safety protection.

Rockwell Automation Support

Rockwell Automation offers support services worldwide, with over 75 sales/support offices, 512 authorized distributors and 260 authorized systems integrators located throughout the United States alone, as well as Rockwell Automation representatives in every major country in the world.

Local Product Support

Contact your local Rockwell Automation representative for:

- sales and order support
- product technical training
- warranty support
- support service agreements

Technical Product Assistance

If you need to contact Rockwell Automation for technical assistance, please review the troubleshooting information in Chapter 5 first. If the problem persists, then call your local Rockwell Automation representative.

Your Questions or Comments on this Manual

If you find a problem with this manual, please notify us of it on the enclosed Publication Problem Report.

Using Change Bars

This document contains updated information. Changes are designated by change bars in the margin, as shown to the left.

New and Revised Information

lists the new and revised information included in this release of the POINT I/O DeviceNet Adapter user manual.

Table Summary of Changes.A

Information about how to	New or revised:	Location:
Use Your Adapter Wisely	New	Preface Chapter 7
Use Auto Start Mode	New	Chapter 2 Chapter 3
Use the Cycling I/O Mapping Feature	New	Chapter 3
Remove and Reinsert Modules on the DeviceNet Network	New	Chapter 3
Use Default Data Maps	New	Appendix B

Purpose of this Manual

This manual describes how to install, configure and operate your POINT I/O DeviceNet™ Adapter, catalog number 1734-ADN.

For more information about:	See page:
Who Should Use this Manual	Preface-1
What the Manual Contains	Preface-2
Related Terms	Preface-3
Related Products and Documentation	Preface-4
Guidelines for Using Your Adapter	Preface-5

IMPORTANT

In the rest of this manual (except Chapter 4), we refer to the POINT I/O DeviceNet adapter (1734-ADN) as the adapter.

In Chapter 4, we refer to the POINT I/O DeviceNet adapter as the scanner because the chapter describes how to configure the adapter for use with POINT I/O modules.

Who Should Use this Manual

You must be able to use RSNetWorx™ for DeviceNet software or similar configuration software to configure your adapter.

We assume you know how to do this in this manual. If you do not, refer to your software user manuals or online help before attempting to use this adapter.

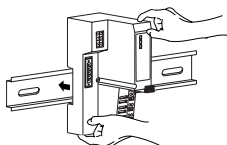
We also assume you are familiar with the POINT I/O product line, including other fieldbus interfaces, I/O modules and power supplies. If you are not familiar with these components, you can read some of the POINT I/O documents listed on page Preface-4.

What the Manual Contains

This manual contains the following sections:

Chapter 1 - Installing the 1734-ADN Adapter

Description of how to install and wire the adapter, how I/O information is communicated and how data is mapped



Chapter 2 - Using Auto Start Mode

Description of how to use the Auto Start Mode on your adapter



Chapter 3 - What is the 1734-ADN Adapter?

Overview of the adapter's features and functionality



Chapter 4 - Configuring the 1734-ADN Adapter for the PointBus

Description of how to configure your adapter as a scanner on the PointBus



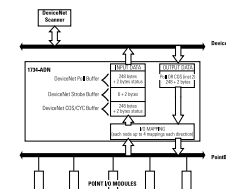
Chapter 5 - Configuring the 1734-ADN Adapter for DeviceNet

Description of how to configure your adapter for the DeviceNet network



Chapter 6 - Communication and I/O Image Table Mapping

Description of how communication takes place between the adapter and I/O modules



Chapter 7 - Troubleshooting the 1734-ADN Adapter

Description of how to use the status indicators and to troubleshoot your adapter



Appendix A - Specifications

Listing of the 1734-ADN specifications



Appendix B - Default Data Maps

Listing of the default data maps for 1734 POINT I/O modules



Related Terms

This manual uses the following terms:

Term:	Definition:
Adapter	POINT I/O DeviceNet adapter (1734-ADN)
Auto Start Mode	Module feature that allows you to easily get your adapter “up and running”.
Autobaud	Feature in devices (e.g. POINT I/O modules) on the DeviceNet network that causes them to listen to communications on the network and set their own baudrate to match the network rate.
Baudrate	Rate of communications between devices on the DeviceNet network.
Change of State (COS)	DeviceNet communications method in which the adapter sends data based on detection of any changed value within the input data. Data is independently received based on change of state from the sender. Data in both directions can be acknowledged or unacknowledged depending on the run time configuration of the system.
ControlFlash	Utility software you can use to update the adapter's firmware with the most current Boot and Application code.
Cyclic	DeviceNet communications method in which the adapter sends data cyclically based on a configured time value. Data is independently received cyclically from the sender. Data in both directions can be acknowledged or unacknowledged depending on the run time configuration of the system.
MAC ID	Media Access Control Identifier (DeviceNet network address)
Master	A DeviceNet network device (e.g. 1771-SDN) that initiates communication with DeviceNet slave devices (e.g. POINT I/O modules) to retrieve data. The master only receives unprompted data when the slave is enabled for COS and there is a change in the device's operating state.
Offline	State of the adapter when it is not powered or maintaining normal communications exchanges with other DeviceNet devices.
Online	State of the adapter when it is powered and maintaining normal communications exchanges with other DeviceNet devices.
PointBus	The POINT I/O backplane. PointBus maintains all DeviceNet network protocol but also offers configuration capabilities.
Polled	DeviceNet communications method in which adapter sends data in response to received data.
RSNetWorx for DeviceNet	Configuration software for the adapter and POINT I/O modules.
Scanlist	The list of POINT I/O modules connected to the adapter.

Term:	Definition:
Scanner	Operating state of the 1734-ADN when it retrieves I/O data from POINT I/O modules.
Slave	A DeviceNet network device that cannot initiate communication (except when configured with COS enabled) but responds to a DeviceNet master device.
Strobe	Adapter sends data in response to the strobe command. The single bit allocated to the adapter in the strobe message is not used. If the configured size of the input data (sent from the adapter) is greater than 8 bytes, the strobe connection establishment will fail. In this case, the input size must be reconfigured to 8 bytes or less.

Related Products and Documentation

The following table lists related POINT I/O products and documentation:

Document	Cat. No.	Publication
POINT I/O Technical Data	1734-Series	1734-2.1
POINT I/O Digital and Analog I/O Modules and POINTBlock I/O Modules User Manual	1734-Series and 1734D-Series	1734-UM001
POINT I/O Module Installation Instructions	1734-Series	1734-INxxx (Multiple numbers)
DeviceNet Communication Interface Installation Instructions	1734-PDN	1734-5.7
POINT I/O 24V dc Expansion Power Supply Installation Instructions	1734-EP24DC	1734-5.8
Field Potential Distributor Installation Instructions	1734-FPD	1734-5.9
General Installation Instructions	All 1734	1734-5.10
Wiring Base Assembly Installation Instructions	1734-TB, -TBS	1734-5.11
Wiring Base Assembly Installation Instructions	1734-TB3, -TB3S	1734-IN013A
Terminal Marking Kit	1492-PLTKIT	1492-1.18

If you need more information on these products, contact your local Rockwell Automation/Allen-Bradley distributor, integrator or sales office for assistance. For more information on the documentation, refer to the Allen-Bradley Publication Index, publication SD499.

Guidelines for Using Your Adapter

Remember the following operational guidelines when using your 1734-ADN adapter.

- Do not leave spaces in the I/O. Instead, install all POINT I/O modules adjacent to each other.

IMPORTANT

If you must leave an I/O space open temporarily, you must change the keying position on the mounting base (1734-MB) to #5. This position will prevent you from installing the wrong I/O module on the base.

- Populate every position on the DIN rail.
- Do not add new I/O modules to the end of the POINT I/O system while the system is under power.
- Use both labels with the I/O modules and removable terminal blocks (RTBs).
- Do not separate I/O modules and RTBs with the same number.
- Do not move I/O modules to different locations on the DIN rail after they have been installed and configured. You should always place modules with the matching RTB.
- If adjacent modules (i.e. 2 or more) are removed, replace all of them to operate the POINT I/O system. Input data will hold last state until all previously-removed modules are replaced.
- Use Allen-Bradley terminal markers to identify your POINT I/O modules. The cards are easily ordered from your Rockwell Automation representative under the Bulletin 1492 number.

For more information on the Allen-Bradley terminal marking kits, see page Preface-4.

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	When the Adapter Uses Auto Start Mode, How Does it Map I/O Data? 2-3
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	Using Adapter Features 3-6
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Default Data Maps**Appendix B**

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1734-IE2C Analog Current Input Module	B-5
1734-IE2V Analog Input Module	B-6
1734-OE2C Analog Current Output Module	B-7
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1734D-IA16 Input Module	B-11
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Installing the 1734-ADN Adapter

This chapter describes how to install and wire your adapter.

For more information about:	See page:
Installing the Adapter	1-1
Installing a Replacement DeviceNet Adapter in an Existing System	1-3
Wiring the Adapter	1-4
Chapter Summary and What's Next	1-6

When properly installed, POINT I/O is grounded through the DIN rail to chassis ground. We recommend using zinc plated, yellow chromated steel DIN rail to assure proper grounding.

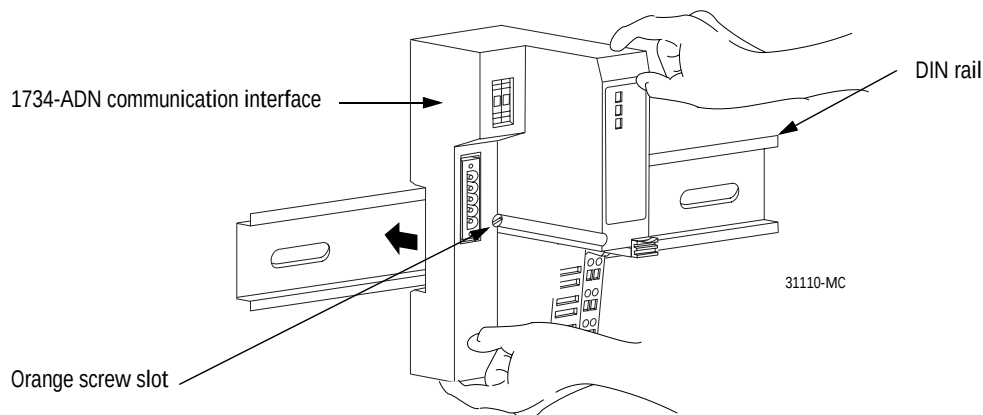
Other DIN rail materials (e.g. aluminum, plastic, etc.) can corrode or oxidize and are poor conductors that may result in improper or intermittent platform grounding.

If you choose not to use zinc plated, yellow chromated steel DIN rail for your POINT I/O, we recommend occasional cleaning of the DIN rail to prevent or lessen the effects of oxidation and corrosion.

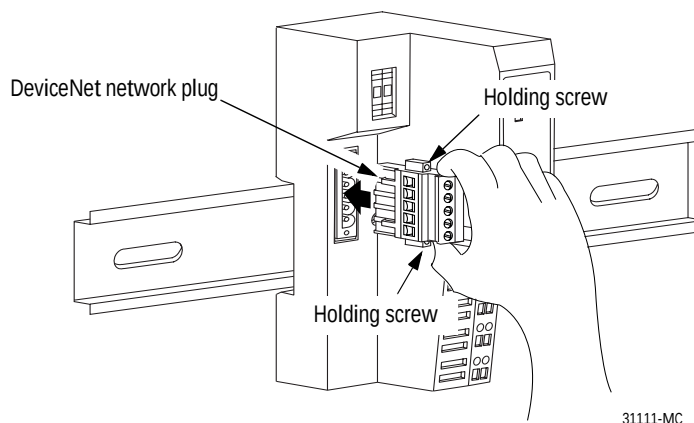
Installing the Adapter

To install the adapter on the DIN rail prior to installing other base units, proceed as follows.

1. Position the adapter vertically in front of the DIN rail.
2. Press firmly to install the adapter on the DIN rail. The locking mechanism locks the adapter to the DIN rail.

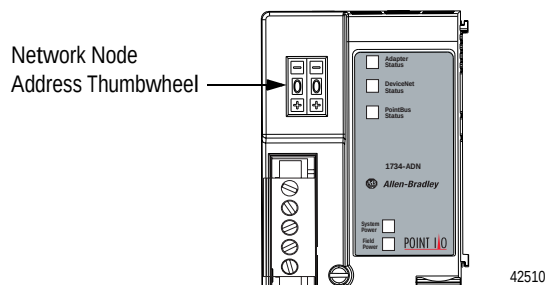


3. Insert the DeviceNet network plug and tighten the holding screws.

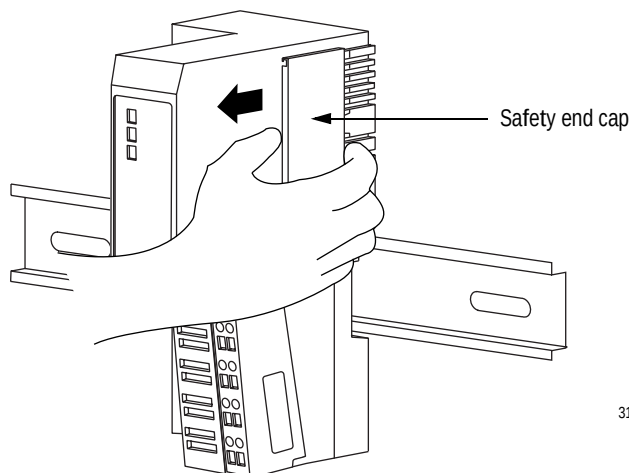


4. Set the node address using the 2-position thumbwheel switch. Valid physical settings range from 00 to 63 (Factory setting =63). Press either the + or - buttons to change the number.

You can also set the node address to some value between 64-99. In this case, you can change the adapter's node address via the RSNetWorx for DeviceNet software. If a value between 64-99 is used, at power-up the node address stored in the adapter's non-volatile memory is used.



5. Slide the safety end cap up to remove. This exposes the backplane and power interconnections.



ATTENTION

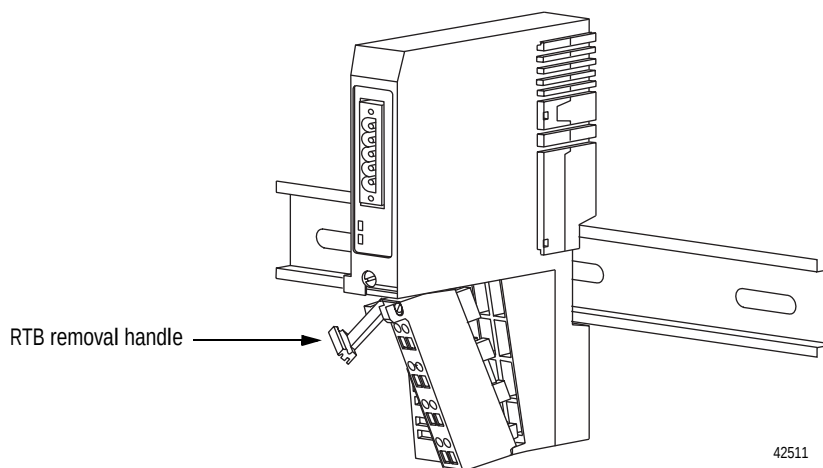
Do not discard the safety end cap. Use this end cap to cover the exposed interconnections on the last mounting base on the DIN rail. Failure to do so could result in equipment damage or injury from electric shock.

Installing a Replacement DeviceNet Adapter in an Existing System

Your existing control application may be using another DeviceNet adapter (e.g. 1734-PDN) that you want to replace with a 1734-ADN DeviceNet adapter. Remove the existing adapter from the DIN rail as follows:

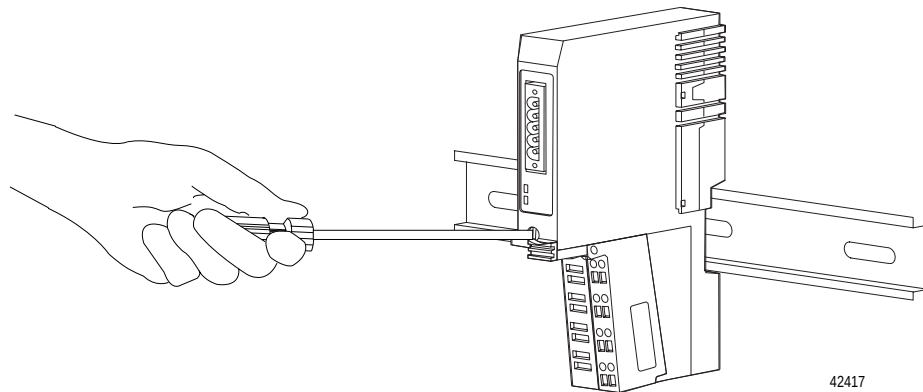
1. Eliminate power to the adapter and all I/O modules in your existing system.
2. Remove the wiring assembly and DeviceNet cable from your existing adapter.
3. Remove the adjacent I/O module.

For information on how to remove POINT I/O modules from the DIN rail, see the associated publications for those modules.



42511

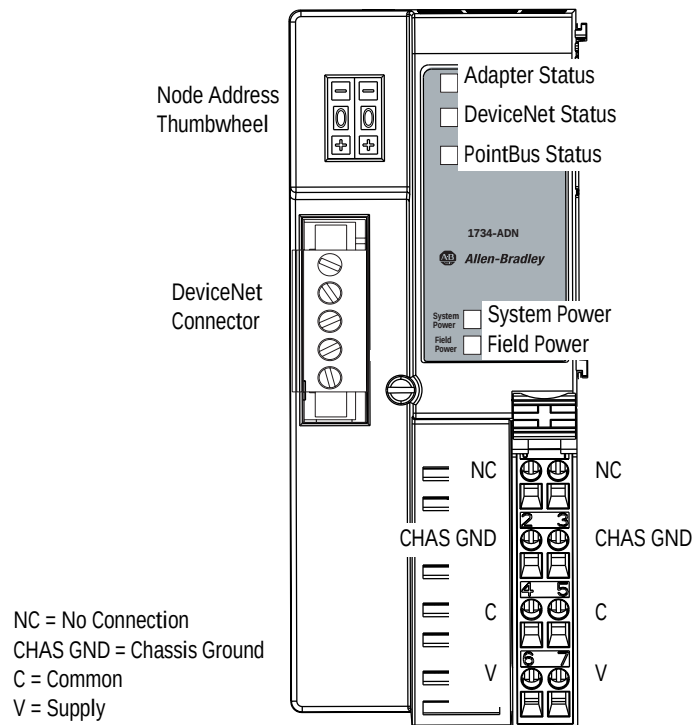
4. Use a small bladed screwdriver to rotate the DIN rail locking screw to a vertical position and release the locking mechanism.



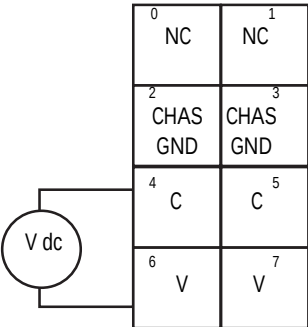
5. Pull the adapter off of the DIN rail to remove it from the existing system.
6. Insert the new adapter into slot 0 using the steps described on page 1-1.
7. Reattach I/O modules to the new adapter.

Wiring the Adapter

Your adapter's wiring and network designations are shown below.



12/24V dc



This dc supply is connected to the internal power bus.

You cannot supply power to the adapter from the DeviceNet power supply.

42513

NC = No Connection
C = Common

CHAS GND = Chassis Ground
V = Supply (Do not connect 120/240V ac power to this supply.)

Terminal		Notes
0	No connection	Reserved
1	No connection	
2	Chassis Ground	
3	Chassis Ground	
4	Common	
5	Common	
6	Voltage Input	Apply 12/24V dc. Connects to the internal power bus.
7	Voltage Input	

DeviceNet Connection Plug Wiring



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Chapter Summary and What's Next

In this chapter, you learned how to install and wire your adapter. Move to chapter 3 for information about how to configure your adapter for use on the PointBus.

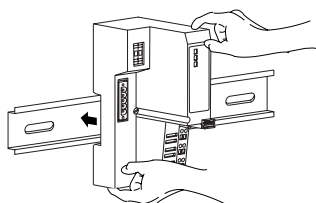
Using Auto Start Mode

This chapter describes how to use the Auto Start Mode with your POINT I/O DeviceNet adapter.

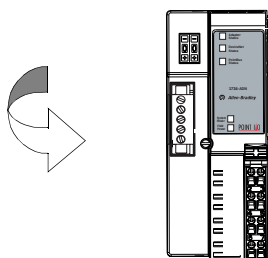
For more information on:	See page:
Why Use Auto Start Mode?	2-2
Installing the Adapter	2-4
Wiring the Adapter	2-6
Wiring the Adapter	2-6
Using RSNetWorx for DeviceNet	2-8
Beginning Auto Start Mode	2-9
Using the Adapter's Default Settings	2-11
Using Custom Configuration	2-12
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This chapter assumes you already have a DIN rail installed for your POINT I/O system. There are five simple steps to the Auto Start Mode:

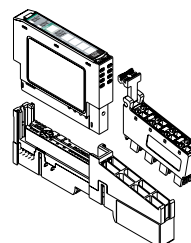
1. Installing the Adapter



2. Wiring the Adapter



3. Installing the I/O Modules



4. Using RSNetWorx for DeviceNet



5. Beginning Auto Start



Why Use Auto Start Mode?

Auto Start Mode offers you a quick and easy method of getting your POINT I/O system 'up and running'. If your POINT I/O application can use default configuration (parameters described on 2-11), you should use Auto Start Mode to easily begin operations.

Once your adapter is:

- installed
- connected to the system's I/O modules
- online (in RSNetWorx for DeviceNet)

you only need to choose the Auto Start Mode option and the adapter begins working with a default configuration.

IMPORTANT

Although Auto Start Mode allows your adapter to operate with a default configuration, you can write a custom configuration after operation has begun.

For more information on how to write custom configuration for your adapter on DeviceNet, see Chapter 5, Configuring the 1734-ADN Adapter for DeviceNet.

What Does Auto Start Mode Do?

When using Auto Start Mode, the adapter:

1. Sets all modules on the backplane to Auto Baud.
2. Reads module IDs on the backplane.
3. Sets modules addresses sequentially.
4. Generates a scanlist for the backplane.
5. Maps I/O data, based on byte, word and double-word boundaries.

When this sequence of events is completed, the POINT I/O modules connected to the adapter are ready to accept connections from a scanner.

When the Adapter Uses Auto Start Mode, How Does it Map I/O Data?

In Auto Start Mode, you can map I/O data in the adapter's memory in one of the following ways:

- Byte Boundaries
- Word Boundaries
- Double Word Boundaries

Byte Boundaries

I/O data is mapped in the adapter's memory at the next available byte. This option works best in applications that use Allen-Bradley PLCs and SLCs.

Word Boundaries

I/O data is mapped in the adapter's memory at the next available word. This option works best in applications that use Allen-Bradley PLCs and SLCs.

Double Word Boundaries

I/O data is mapped in the adapter's memory at the next available double word. This option works best in applications that use Allen-Bradley Logix products.

Are There Any Requirements to Using Auto Start Mode?

There are two **requirements** to using the Auto Start Mode:

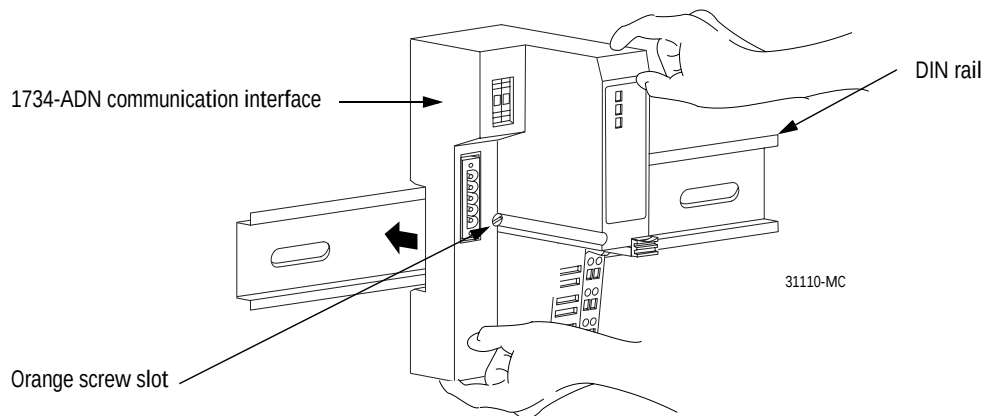
- Your 1734-ADN DeviceNet adapter must use firmware revision 2.001 or higher. If your adapter does not have the required firmware, you can upgrade it with the ControlFlash tool. For more information on how to upgrade your adapter's firmware, contact your Rockwell Automation representative.
- Your 1734-ADN DeviceNet adapter must be free of I/O connections on DeviceNet when you use Auto Start Mode. If another scanner device has established I/O connections with the adapter, the attempt to use Auto Start Mode is rejected.

Also, when the adapter is configuring itself in Auto Start Mode, no other device can establish I/O connections to the adapter.

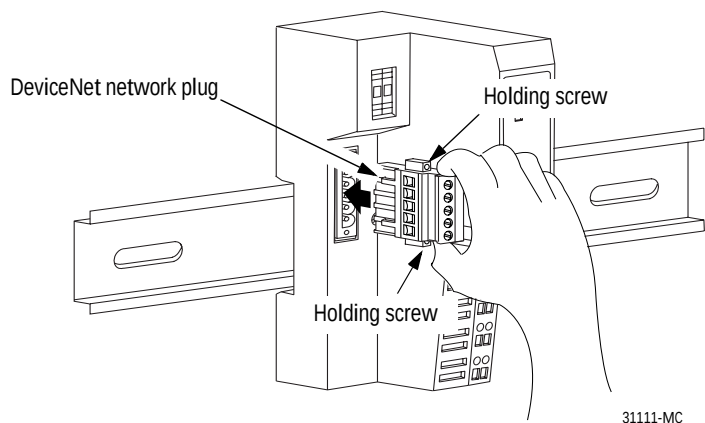
Installing the Adapter

To install the adapter on the DIN rail prior to installing other base units, proceed as follows.

1. Position the adapter vertically in front of the DIN rail.
2. Press firmly to install the adapter on the DIN rail. The locking mechanism locks the adapter to the DIN rail.



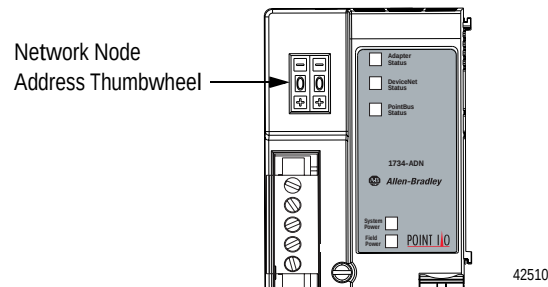
3. Insert the DeviceNet network plug and tighten the holding screws.



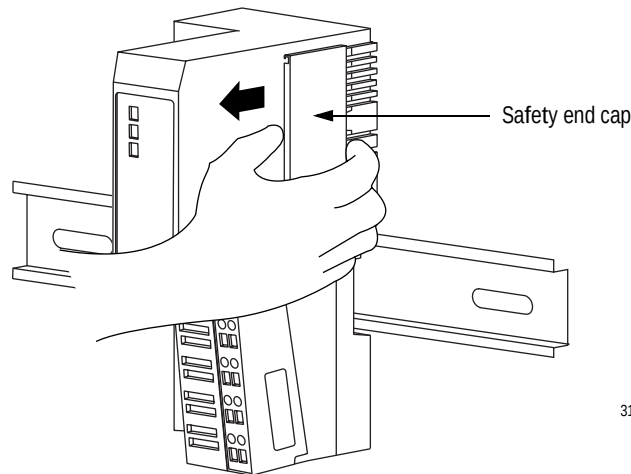
4. Set the node address using the 2-position thumbwheel switch. Valid physical settings range from 00 to 63 (Factory setting =63). Press either the + or - buttons to change the number.

You can also set the node address to some value between 64-99. In this case, you can change the adapter's node address via the RSNetWorx for DeviceNet software. If a value between 64-99 is

used, at power-up the node address stored in the adapter's non-volatile memory is used.



5. Slide the safety end cap up to remove. This exposes the backplane and power interconnections.



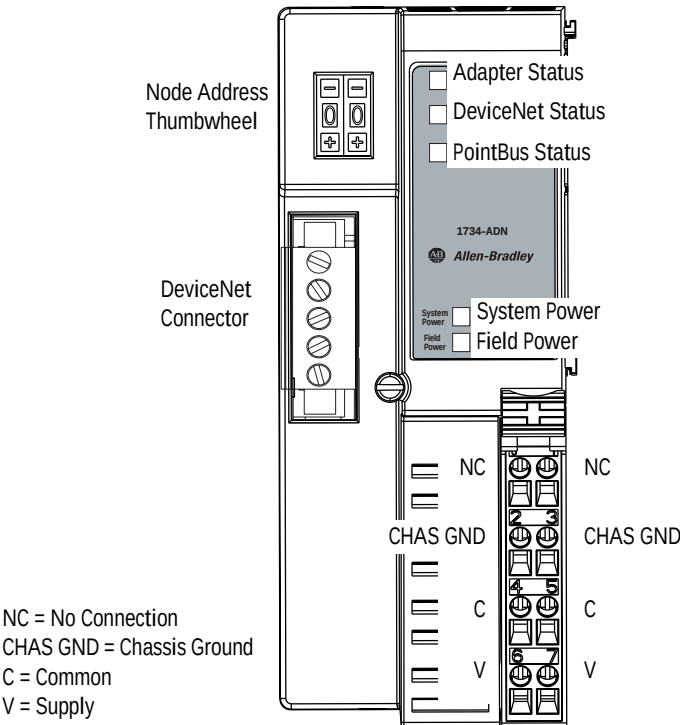
ATTENTION



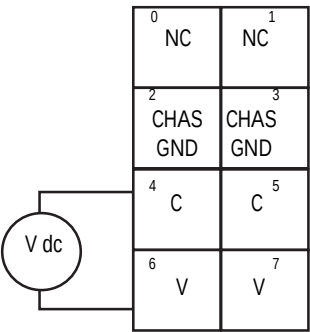
Do not discard the safety end cap. Use this end cap to cover the exposed interconnections on the last mounting base on the DIN rail. Failure to do so could result in equipment damage or injury from electric shock.

Wiring the Adapter

Your adapter's wiring and network designations are shown below.



12/24V dc



This dc supply is connected to the internal power bus.

You cannot supply power to the adapter from the DeviceNet power supply.

42513

NC = No Connection
C = Common

CHAS GND = Chassis Ground
V = Supply (Do not connect 120/240V ac power to this supply.)

Terminal		Notes
0	No connection	Reserved
1	No connection	
2	Chassis Ground	
3	Chassis Ground	
4	Common	
5	Common	
6	Voltage Input	Apply 12/24V dc. Connects to the internal power bus.
7	Voltage Input	

DeviceNet Connection Plug Wiring

DeviceNet connection	Black	1	-V
	Blue	2	CAN - Low
	Bare	3	Shield
	White	4	CAN - High
	Red	5	+V

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Installing the I/O Modules

After installing and wiring the adapter, you should install the POINT I/O modules that will be used in your application.

For more information on installing and wiring the multiple POINT I/O modules, see the installation instructions for each catalog number or the POINT I/O Digital and Analog Modules and POINTBlock I/O Modules user manual, publication 1734-UM001.

Using RSNetWorx for DeviceNet

You must use the RSNetWorx for DeviceNet software to configure your adapter. The adapter module has a default configuration available via the Auto Start Mode.

Follow the steps below to use Auto Start Mode.

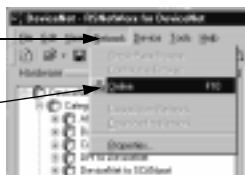
1. Go online in the software.

IMPORTANT

Auto Start Mode is only available when RSNetWorx for DeviceNet is online.

- A. Click on the Network pull-down menu.

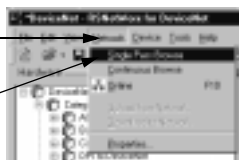
- B. Choose Online.



2. Browse for the network (e.g. You can use Single Pass Browse).

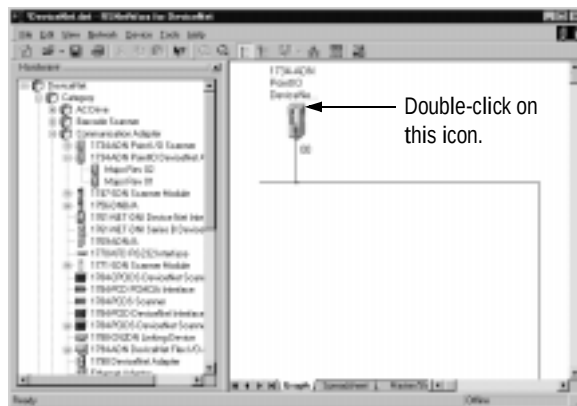
- A. Click on the Network pull-down menu.

- B. Choose a Browse type.



The adapter appears on the Browse screen.

3. To launch the adapter information menu, double-click on the adapter icon.



You can either:

- upload configuration from the device to update the software
- download configuration from the software to the device.

4. Upload configuration from the device.

Upload here.

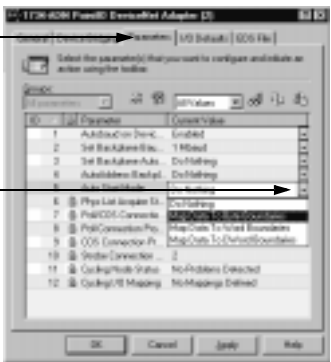


Beginning Auto Start Mode

1. After you upload configuration from the device to the software, you must begin Auto Start Mode.

A. Click on the Parameters tab.

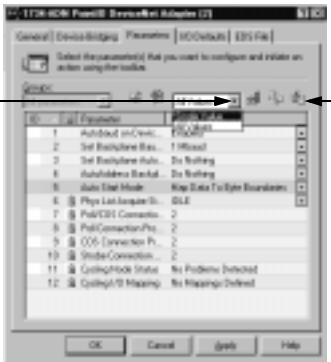
B. Use the Auto Start Mode pull-down menu to choose a mapping option. The options are described on page 2-3.



2. Download the Auto Start Mode value. Make sure you only download this Single value, as shown below.

A. Choose Single Value.

B. Download the value.



After 30-40 seconds, the adapter begins operations and uses the configuration most recently applied. During the download the Physical List Acquire Status field displays the words: *Auto Start Mode*, but after the download is complete the field displays the word: *Idle*.

For more information, see Using the Adapter's Default Settings on page 2-11.

IMPORTANT

If the Auto Start Mode download fails, the LEDs on the front of your adapter turn a solid red. To clear the LEDs and use Auto Start Mode again, follow these steps:

1. If ADN has autobaud enabled for the DeviceNet network and no other devices are producing DeviceNet traffic, start an RSLinx Who.
2. From the 1734-ADN's EDS-based DeviceNet configuration menu, enable *Set Backplane Autobaud* and perform a download-single operation.
3. Cycle power on the 1734-ADN.
4. If any more red LEDs (as previously described) appear, repeat the steps 2 & 3 until no more red LEDs appear.
5. When no red LEDs appear, attempt the Auto Start Mode operation again, as described on page 2-9.

The sequence described above should never be required for out-of-box IO modules.

Using the Adapter's Default Settings

When you use the Auto Start Mode, the adapter's configurable parameters use the same values that it was last configured for. For example, if the Set Backplane Baudrate was last configured to use a baud rate = 125kbaud, the adapter uses that backplane baud rate when Auto Start Mode begins.

The adapter uses default settings when it is shipped from the factory. When Auto Start Mode is used, the adapter and connected I/O modules go through the following sequence of events:

- Connections are established to I/O modules
- The adapter makes Change of State (COS) connections if the I/O module supports COS. If not, the connection is Poll.
- Data is mapped to the connections.
- I/O module data is mapped to the COS connection on DeviceNet. You must hand type the values displayed in the *Poll/COS Connection Consume Size* and *Poll/COS Connection Produce Size* fields in your DeviceNet scanner's configuration.

Table 2.A lists the default settings (when shipped from the factory) for each configurable parameter.

Table 2.A
Default Adapter Settings in Auto Start Mode

Parameter	Brief Definition:	Default setting out of box
Autobaud on DeviceNet	Turn ON/OFF feature that allows the adapter to automatically detect the current baudrate on the DeviceNet network.	Enabled
Set Backplane Baudrate	Set baudrate for all backplane IO modules currently present on the backplane.	1Mbaud
Set Backplane Autobaud	Set autobaud feature for all backplane IO modules currently present on the backplane.	N/A
Auto Address Backplane	Sequentially order the node addresses of IO modules currently present on the backplane.	N/A
Physical List Acquire Status	Status of Physical List acquire process.	N/A
Poll/COS Connection Consume Size	Size of data consumed by the ADN's Poll/COS (inst 2) connection on DeviceNet.	2 ¹

Table 2.A
Default Adapter Settings in Auto Start Mode

Parameter	Brief Definition:	Default setting out of box
Poll Connection Produce Size	Size of data produced by the ADN's Poll connection on DeviceNet.	2
COS Connection Produce Size	Size of data produced by the ADN's COS connection on DeviceNet.	2 ¹
Strobe Connection Produce Size	Size of data produced by the ADN's Strobe connection on DeviceNet.	2
Cycling Node Status	This parameter provides a means for the user to determine if any problems exist with an IO module on the backplane.	N/A

1 These parameter values are dependent on the I/O configuration and must be hand typed into the DeviceNet scanner's configuration.

For more detailed information about each of these features, and a complete listing of all the 1734-ADN adapter's features, see Chapter 3, What is the 1734-ADN Adapter?

Using Custom Configuration

The Auto Start Mode is recommended to quickly and easily get your POINT I/O system 'up and running'. But this mode does not prevent you from changing the adapter's default configuration after system operation has begun.

For more information on how to write custom configuration for your adapter on DeviceNet, see Chapter 4, Configuring the 1734-ADN Adapter for the PointBus and Chapter 5, Configuring the 1734-ADN Adapter for DeviceNet.

Chapter Summary and What's Next

In this chapter, you learned about the Auto Start Mode. Move on to Chapter 3, What is the 1734-ADN Adapter?

What is the 1734-ADN Adapter?

This chapter describes the POINT I/O DeviceNet adapter, including descriptions of the adapter's features and functionality.

For more information about:	See page:
Using the Adapter	3-1
Understanding the DeviceNet Network and PointBus	3-5
Using Adapter Features	3-6
Features that Work on DeviceNet and PointBus	3-7
Features that Work on DeviceNet Only	3-9
Features that Work on PointBus Only	3-15
Chapter Summary and What's Next	3-18

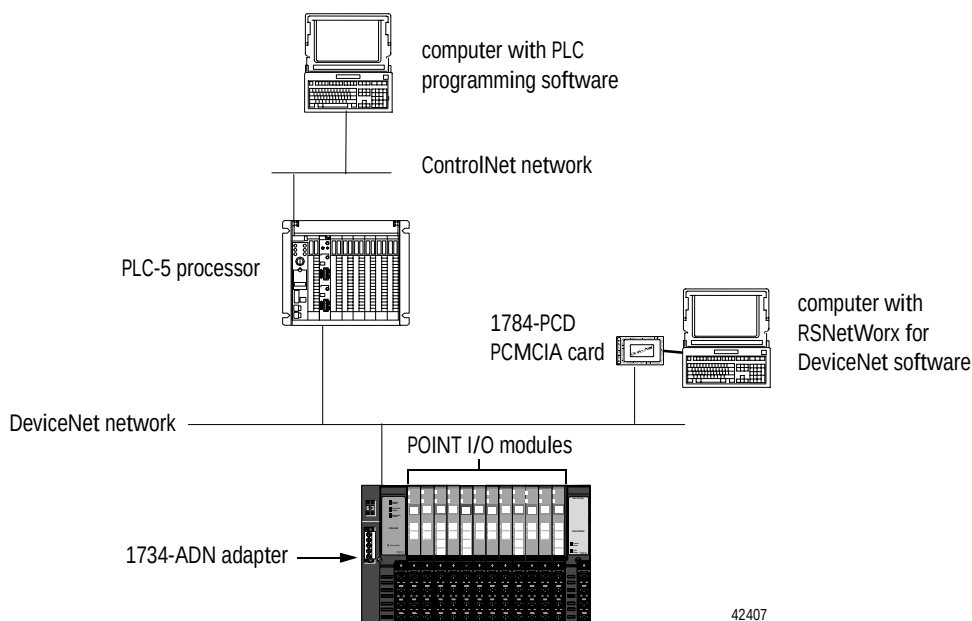
Using the Adapter

The adapter resides on the DeviceNet network and the POINT I/O backplane (PointBus) simultaneously.

IMPORTANT

The PointBus maintains all DeviceNet network protocol but also offers configuration capabilities.

From this position, the adapter interfaces between DeviceNet devices and POINT I/O modules. The graphic below shows the adapter on the DeviceNet network and PointBus.



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After you have installed your adapter into a POINT I/O system, you must perform the following tasks:

1. Set Backplane Baudrate
2. Set Backplane I/O Module Addresses
3. Configure the PointBus I/O
4. Configure the DeviceNet Network

The steps mentioned above are explained briefly here and then in greater detail throughout this manual. You must complete the steps for the adapter to work with DeviceNet masters (e.g. PLC-5 processor) and POINT I/O modules.

Set Backplane Baudrate

The adapter and POINT I/O modules must use the same baudrate to communicate with each other. Use one or both of the following to set a backplane baudrate.

- Enable or disable the Backplane Autobaud feature for POINT I/O modules. - See pages 3-11 & .
- Set the adapter baudrate. - See pages 3-8 & .

Set Backplane I/O Module Addresses

Once the adapter and POINT I/O modules are communicating at the same rate on the backplane, you must make sure all modules use a valid MAC ID.

Set the Auto Address feature for POINT I/O modules - See pages 3-12 & .

Configure the PointBus I/O

In the first two steps, you set a consistent communication rate and made sure each module uses address for communication. Next you must configure the PointBus (e.g. set scan list).

For more information on configuring the PointBus, see Chapter 3, .

Configure the DeviceNet Network

Finally, you must configure the adapter for communication with a master (e.g. 1747-SDN).

For more information on configuring the DeviceNet network, see Chapter 4, Configuring the 1734-ADN Adapter for the PointBus.

You must understand all of the adapter's features to effectively use it in your POINT I/O system. Keep these four steps:

- 1.** Set Backplane Baudrate
- 2.** Set Backplane I/O Module Addresses
- 3.** Configure the PointBus I/O
- 4.** Configure the DeviceNet Network

in mind as you read this manual.

Remove and Reinsert Modules on the DeviceNet Network

POINT I/O modules can easily be removed and reinserted on the DeviceNet network. If the removal and reinsertion is not done with caution, you can affect the adapter's operations and, consequently, the entire POINT I/O application.

If you must remove and reinsert modules, we recommend the following:

- Do not move I/O modules to different locations on the DIN rail after they have been installed and configured.
- Always place modules with the matching RTB.
- If adjacent modules (i.e. 2 or more) are removed, replace all of them before attempting to operate the POINT I/O system. Input data will hold last state until all previously-removed modules are replaced.
 - If adjacent modules are removed and all but one is returned, the adapter cannot verify the location of the returned modules. For example, if modules are removed from nodes 3 and 4 and only the module from node 4 is returned, the adapter cannot verify the location. In this case, the adapter alerts you (via RSNetWorx for DeviceNet) that it cannot verify the presence of modules in the affected locations.
 - If modules of **different types** are removed and returned to the wrong locations, the adapter identifies the returned modules and alerts you (via RSNetWorx for DeviceNet) that the error has occurred and must be corrected.
 - If modules of the **same type** are removed and returned to the wrong locations, the adapter identifies the returned modules, updates their MAC IDs and continues operation.

IMPORTANT

The removal and return scenario exists whether the system is under power or not. If the system is under power, the scenario arises immediately. If the system is not under power, the scenario arises in the next power cycle.

Also, the example above shows removal of two adjacent modules. The scenario described in this release note exists anytime 2 or more adjacent modules are removed and not all are returned.

Understanding the DeviceNet Network and PointBus

DeviceNet Network

Your adapter serves as a slave to DeviceNet devices. The adapter receives data from and returns data to the master through I/O connections, such as:

- Change of State (COS)
- Cyclic
- Polled
- Strobe

PointBus

On the PointBus, your adapter acts as a scanner and is the master of POINT I/O modules. The adapter performs the following functions:

- Exchanges I/O data with modules on PointBus
- Collects I/O data from the PointBus and sends it to devices on the DeviceNet network (e.g. scanners or controllers)
- Supplies power to up to 12 I/O modules

Data Collection

The adapter collects I/O data from up to 63 modules via the PointBus. The I/O modules appear on the DeviceNet network as a single node, though, and require only one DeviceNet node address.

IMPORTANT

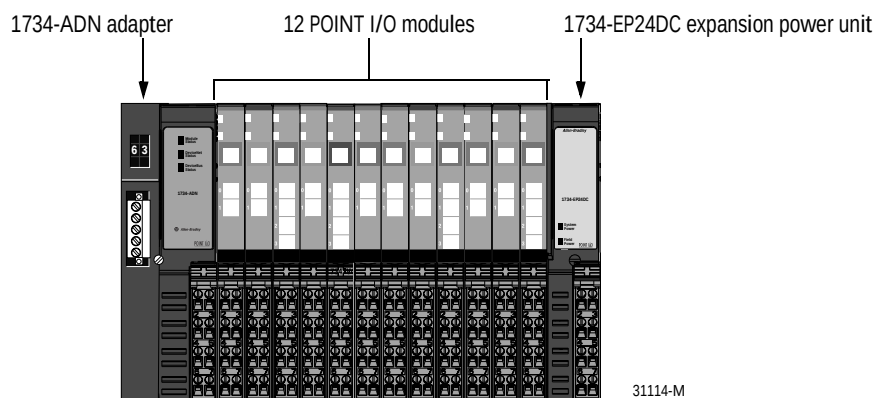
If Automatic Device Replacement (ADR) is enabled on the adapter, you can only connect up to 62 modules via the PointBus.

For more information on ADR, see page 3-15.

Module Power

The adapter supplies 5V logic power to POINT I/O modules by converting 24V dc field power to PointBus 5V power.

You can connect up to 63 I/O modules to each adapter, and you can power up to 12 I/O modules from the adapter (with a maximum of 10A of field power). After the 12th module, you must use the integrated, isolated 24V dc expansion power unit (1734-EP24DC) to power additional I/O modules, as shown below.



For more information on the 1734-EP24DC expansion power unit, see:

- POINT I/O Technical Data, publication 1734-2.1
- POINT I/O 24V dc Expansion Power Supply Installation Instructions, publication 1734-5.8

Using Adapter Features

Because the adapter resides on two networks simultaneously, it has:

- Features that Work on DeviceNet and PointBus
- Features that Work on DeviceNet Only
- Features that Work on PointBus Only

Some of the features described in the following sections occur automatically on the adapter (e.g. Configuration Consistency Check) and others are configurable (e.g. Baudrates). Features that are affected by your actions are noted as such.

Features that Work on DeviceNet and PointBus

Your adapter uses the following features on both the DeviceNet network and the PointBus:

- Self-Test
- Field Upgradable Firmware
- Fully Software Configurable
- Connections
- Baudrates

Self-Test

On power-up, the adapter performs a self-test. The adapter tests various internal and programmatic memories and checks the status indicators (LEDs).

Field Upgradable Firmware

You can update the adapter's firmware with the ControlFlash Utility software. This feature allows you to always use the most current Application code.

Fully Software Configurable

The adapter is fully software configurable using RSNetWorx for DeviceNet. You must configure the adapter for use with a DeviceNet device (e.g. 1747-SDN) and separately for use with POINT I/O modules.

For more information on how to configure your adapter for use with a DeviceNet device, see Chapter 3, .

For more information on how to configure your adapter for use with POINT I/O modules, see Chapter 4, Configuring the 1734-ADN Adapter for the PointBus.

Connections

Your adapter supports the following connections on both the DeviceNet network and PointBus:

- I/O connections, such as:
 - Polled
 - Strobe
 - COS
- Explicit connections

You can use I/O mapping to determine the data contained in each connection. For information on I/O mapping, see Chapter 5, .

The adapter supports Master/Slave connection types on the **DeviceNet** network. On **PointBus**, the adapter functions as a scanner device, exchanging data with I/O modules.

Baudrates

Choose baud rates for the adapter in the RSNetWorx for DeviceNet software. It supports these rates:

- 125Kbaud
- 250Kbaud
- 500Kbaud
- Autobaud - The adapter detects the DeviceNet network baud rate and automatically sets its own baud rate to match the network.
- In addition, the PointBus can be configured to operate at 1Mbaud (1000Kbaud).

Features that Work on DeviceNet Only

Your adapter uses the following features only on the DeviceNet network:

- Auto Start Mode
- Auto Catalog Replace
- Backplane Baudrate
- Backplane Autobaud
- Auto Address
- Physical List Acquire Status
- Cycling Node Status
- Poll/COS Connection Consume Size
- Poll/COS Connection Produce Size
- COS Connection Produce Size
- Strobe Connection Produce Size
- Cycling I/O Mapping

Auto Start Mode

Auto Start Mode allows you to easily get your adapter installed and operating. In this mode, the adapter's configurable features operate as they were most recently configured. For example, if Autobaud on DeviceNet was enabled in the adapter's last configuration, it will be enabled when Auto Start Mode is used.

For a more detailed explanation of how to use Auto Start Mode, see Chapter 2.

Auto Catalog Replace

Auto Catalog Replace corrects errors that might occur when modules of the same type are removed and replaced in the wrong location. If modules of the **same type** are removed and returned to the wrong locations, the adapter identifies the returned modules, updates their MAC IDs and continues operation.

IMPORTANT

If modules of **different types** are removed and returned to the wrong locations, the adapter identifies the returned modules and alerts you (via RSNetWorx for DeviceNet) that the error has occurred and must be corrected.

Backplane Baudrate

Backplane Baudrate sets a specific baudrate for all I/O modules connected to the DeviceNet master via the adapter.

Set this parameter in RSNetWorx for DeviceNet to one of the following baudrates:

- 125 Kbaud
- 250 Kbaud
- 500 Kbaud
- 1 Mbaud

When you download this parameter, the adapter sends a command to reset all present I/O modules to the new baudrate. If additional modules are connected to the adapter, you must download the Backplane Baudrate to make sure the new modules use the same rate as the others.

The baudrate may not take effect until power is recycled or the I/O modules are reset.

IMPORTANT

Changes to the Backplane Baudrate parameter only take effect if they are downloaded on an individual basis (e.g. If you change the Backplane Baudrate and download the changes with additional changes to other features, the Backplane Baudrate remains at the previous setting.).

Also, this parameter should be set to “Do Nothing” when you download all parameters or when Automatic Device Replacement is enabled for the adapter.

If you want to set an I/O module to use a specific baudrate (i.e. 125, 250, 500 or 1000Kbaud), you must first disable Backplane Autobaud for that module.

Backplane Baudrate performs the following functions:

- Sets the backplane baudrate to the adapter’s baudrate
- Sends a message to all connected I/O modules that contains the baudrate - If an I/O module is set to autobaud, it receives the message but ignores the new baudrate.

Backplane Autobaud

Backplane Autobaud automatically sets a baudrate for all I/O modules currently attached to the backplane. The adapter does not set a specific rate, though (as with Backplane Baudrate).

If you enable Backplane Autobaud in the adapter, the adapter only enables the Autobaud in all I/O modules. When the modules listen to communications on the DeviceNet network, they detect the rate of communication and automatically set their own baudrates to match the network rate.

The module does not actually automatically detect the backplane baudrate until power is cycled or the module is reset.

TIP

The Backplane Autobaud, when enabled, is useful if you swap POINT I/O modules between networks that are operating at different baudrates.

Enable Backplane Baudrate in RSNetWorx for DeviceNet.

IMPORTANT

Changes to the Backplane Autobaud parameter only take effect if they are downloaded on an individual basis (e.g. If you enable the Backplane Autobaud setting and download the change with additional changes to other features, the Backplane Baudrate remains disabled.).

This parameter should be set to “Do Nothing” when you download all parameters or when Automatic Device Replacement is enabled for the adapter.

If you want to set an I/O module to use a specific baudrate (i.e. 125, 250, 500 or 1000Kbaud), you must first disable Backplane Autobaud for that module.

Auto Address

Auto Address sequentially orders the node addresses of I/O modules. This parameter is not a mode but occurs on a single occurrence basis only. The node address selected is assigned to the module closest to the adapter. The next closest module is assigned the next numerically higher value. The numbering pattern continues for all connected I/O modules.

Enable this parameter in the RSNetWorx for DeviceNet software.

IMPORTANT

Changes to the Auto Address parameter only take effect if they are downloaded on an individual basis (e.g. If you enable the Auto Address and download the changes with additional changes to other features, the node addresses of the I/O modules remain at the previous settings.).

This parameter should be set to “Do Nothing” when you download all parameters or when Automatic Device Replacement is enabled for the adapter.

Physical List Acquire Status

Physical List Acquire Status shows the status of the Physical List acquire process. The adapter maintains a Physical List that indicates the order of the node addresses of all POINT I/O modules present on the backplane.

The adapter requires that each I/O module has a MACID greater than that of its neighbor to its immediate left. The list is created at power-up and each time a module is inserted on the backplane.

The valid values are:

- IDLE
- BUSY
- AUTO START MODE

Cycling Node Status

Using the Cycling Node Status parameter, you can easily determine the status of any POINT I/O modules with which the adapter is experiencing problems. A corresponding text string appears, including the MACID and a description of the status code reported in the Node Status Table. For more information on the Node Status Table, see page 6-8.

For the connection sizes mentioned below, the I/O connection sizes on DeviceNet are dependent on the scanlist configuration on the backplane.

Poll/COS Connection Consume Size

Poll/COS Connection Consume Size shows the consume size of the poll/COS (Instance 2) I/O connection on DeviceNet.

Poll Connection Produce Size

Poll Connection Produce Size shows the produce size of the polled (Instance 2) I/O connection on DeviceNet.

COS Connection Produce Size

COS Produce Size shows the produce size of the Change of State connection on DeviceNet.

Strobe Connection Produce Size

The Strobe Produce Size shows the produce size of the Strobe connection on DeviceNet.

Cycling I/O Mapping

Cycling I/O Mapping show you how data is mapped in the adapter's scanlist. The data, as shown below, is listed in order of active modules in the scanlist.



The data format is NN OBBB:b-BBB:b,IDBBB:b-BBB:b, where:

- NN = node number
- O or I = data type (output or input)
- BBB = byte number
- b = bit number
- D = DeviceNet connection (C [COS], S [strobe], or P [poll])

IMPORTANT

If an I/O module's data has multiple mappings, you must use RSNetWorx for DeviceNet to browse to the backplane to view the mappings.

Features that Work on PointBus Only

Your adapter uses the following features only on the PointBus:

- Automatic Device Replacement
- Physical Ordering
- Interscan Delay
- Foreground to Background Poll Ratio
- Expected Packet Rate
- Transmit Retries

Automatic Device Replacement

With Automatic Device Replacement (ADR), the adapter automatically configures a new replacement module.

IMPORTANT

The replacement module must match the original module (i.e. same vendor I.D., device type, product code and major revision) for ADR to work. The parameters that must match are those selected in the electronic keying portion of the scan list.

The backplane configuration parameters (e.g. Auto Address) should be set to “Do Nothing”.

The adapter is capable of holding approximately 64K of configuration data for POINT I/O modules connected to it. The adapter sends configuration data to an I/O module each time connections are created with that module (i.e. power cycle or module insertion to backplane).

You can exchange an old module for a new one if the following conditions are met:

- ADR is enabled for the adapter.
- The new module matches the old one (i.e. electronic keying).
- The new module is inserted in proper location.

If the conditions listed above are met, the new module's MAC ID is changed to the appropriate value, if necessary, and the configuration information is subsequently downloaded to the module.

Physical Ordering

At start-up, or when an I/O module is inserted, the adapter detects the I/O modules' order, based on MACID. With Physical Ordering, the adapter detects if any POINT I/O modules connected to it are out of order. If this condition is detected, the adapter changes the MACIDs of any new modules.

IMPORTANT

If any I/O modules are missing at start-up, none of the module enter run mode.

The adapter's MACID is always 0 on PointBus. The MACIDs of each attached I/O module must be sequentially ordered (i.e. each module's MACID is greater than the left adjacent module). Gaps may be left between modules.

Interscan Delay

Interscan Delay is the time delay between consecutive I/O scans. The default setting is 10mS. You can change this parameter in the RSNetWorx for DeviceNet software.

The scanner uses this period of time to perform non-time-critical communications on the DeviceNet network, such as communicating with RSNetWorx for DeviceNet software. Setting this parameter to a very low value increases the latency for non-time-critical scanner operations, including the time required to respond to RSLinx software and configuration functions. Setting this parameter to a very large value reduces the freshness of the I/O data being collected by the scanner and is not advisable.

Foreground to Background Poll Ratio

Foreground to Background Poll Ratio is the ratio of foreground to background polls. You can set this parameter in the RSNetWorx for DeviceNet software.

Devices can be polled on every I/O scan (foreground) or they can be polled less frequently (background). Whether a particular device will be polled in the foreground or in the background is determined by its Poll Rate parameter on the Edit I/O Parameters dialog box, which is accessed from the Scan List property page.

The poll ratio sets the frequency of poll I/O messages to a device in relation to the number of I/O scans. For example, if the poll ratio is set to 5, the scanner will poll the selected devices once every six I/O scans. We recommend that you use a poll ratio of 1.

Expected Packet Rate

Expected Packet Rate is the rate at which the packets will be expected to be received by the scanner. You set this parameter in the RSNetWorx for DeviceNet software.

IMPORTANT

We recommend that you do **not** change the Expected Packet Rate unless you are instructed to do so by a Rockwell Automation technical support representative.

Transmit Retries

Transmit Retries are the maximum number of times that the scanner will attempt to send an I/O message to a device before it times out and generates an error message. You set this parameter in the RSNetWorx for DeviceNet software

IMPORTANT

We recommend that you do **not** change the Transmit Retries unless you are instructed to do so by a Rockwell Automation technical support representative.

Chapter Summary and What's Next

In this chapter you learned about the 1734-ADN DeviceNet adapter. Move to Chapter 2 to learn how to install and wire your adapter.

Configuring the 1734-ADN Adapter for the PointBus

This chapter describes how to custom configure your adapter for use with POINT I/O modules.

For more information about:	See page:
Configuration Overview	4-1
Adding the Scanner to Your Network	4-2
Setting the Scanner's Parameters	4-3
Going Online	4-8
Chapter Summary and What's Next	4-9

Your adapter works on two networks simultaneously and must be configured for each separately. The chapter explains configuration of the adapter for use with POINT I/O modules.

For information on how to configure the adapter for use on the DeviceNet Network see Chapter 5, Configuring the 1734-ADN Adapter for DeviceNet.

Configuration Overview

You must use the RSNetWorx for DeviceNet software to configure your adapter. You can configure the adapter while it is:

- online
- or
- offline

This chapter shows configuration in the offline mode. Configuration screens appear the same in both modes. The only difference is that if you make changes offline, you must take the adapter online before the configuration changes take effect.

IMPORTANT

Throughout most of this manual, we refer to the POINT I/O DeviceNet adapter (1734-ADN) as the adapter. The adapter also communicates with POINT I/O modules as a scanner, though. In this chapter only, the adapter is referred to as a scanner.

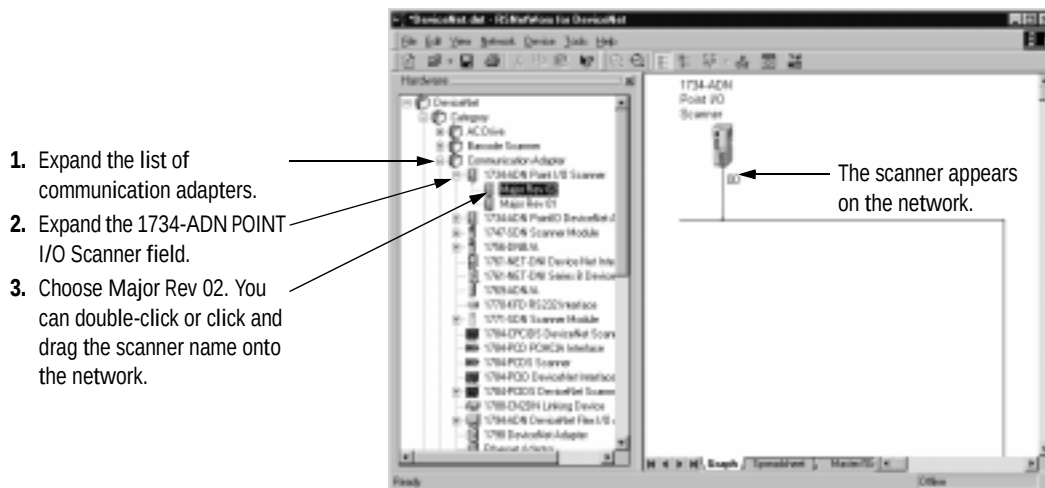
You must follow these steps during configuration:

1. Adding the Scanner to Your Network
2. Adding I/O Modules to Your Network
3. Setting the Scanner's Parameters
4. Going Online

Adding the Scanner to Your Network

Follow these steps:

1. Start RSNetWorx for DeviceNet.
2. Add the scanner as shown below.



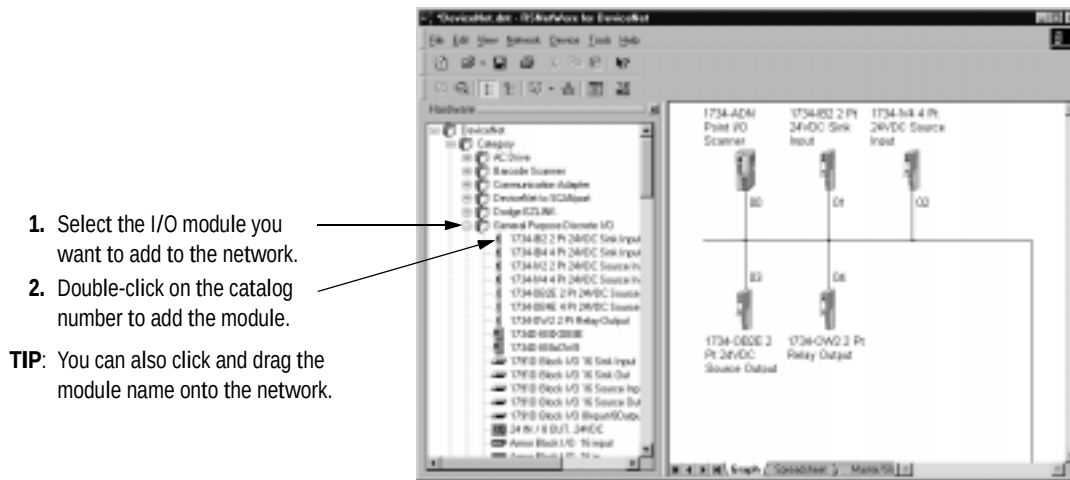
IMPORTANT

The adapter must always exist on the PointBus at Node 00.

Adding I/O Modules to Your Network

After you add the scanner, you must add the POINT I/O modules connected to the scanner on the PointBus. In the offline mode, I/O modules must be added individually. Follow these steps:

1. Add modules as shown below.



You must configure the POINT I/O modules connected to the scanner. For more information on how to configure POINT I/O modules, see the POINT I/O Digital and Analog Modules and POINTBlock I/O Modules user manual, publication 1734-UM001A-EN-P.

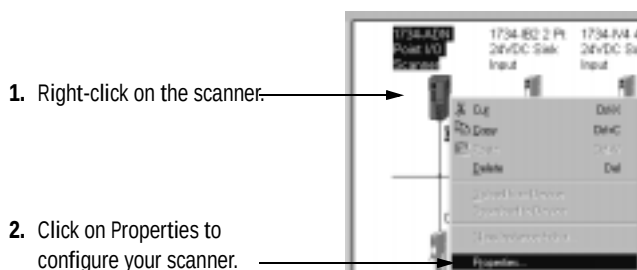
Setting the Scanner's Parameters

After adding it to the network, you must configure the scanner for use with POINT I/O modules.

IMPORTANT

This chapter shows configuration in the offline mode. Changes set in this mode do not take effect until the adapter goes online. For more information on how to go online, see page 4-8.

1. Configure the adapter as shown below.



TIP: You can also double-click on the scanner to view the Properties menus.

You will see a pop-up screen with a series of tabs. Each tab provides options to write configuration for your adapter. The tabs are shown below and on the following pages.

Type the scanner's name here.

Type a description here.

The scanner's address must = 0.

This screen also shows the scanner's device identity. These fields are read-only.

At any point, you can click here to finish changing configuration parameters.

IMPORTANT: Configuration changes made in offline mode do not take effect until the scanner goes online. For more information on how the scanner goes online, see page 4-8.

Use Associate File to associate this configuration file (i.e. configuring the 1734-ADN for communication with POINT I/O modules) with the configuration file that configures the same 1734-ADN for communication with a master device on the DeviceNet network.

For more information on the need to maintain two configuration files in the same adapter, and the simultaneous presence of the adapter on two networks (i.e. DeviceNet as a slave and PointBus as a master), see page 3-1.

Use Associate File to associate this configuration file (i.e. configuring the 1734-ADN for communication with POINT I/O modules) with the configuration file that configures the same 1734-ADN for communication with a master device on the DeviceNet network.

Use Clear Association to remove previously established configuration file associations that no longer apply to your adapter.

Set the InterScan Delay here.

Set the Foreground to Background Poll Ratio here.

Click here to reset the InterScan Delay and Foreground to Background Poll Ratio back to the module default values.

Click here to change the Advanced Module Settings, as shown in the screen below.

We recommend you **DO NOT** change module settings unless advised to do so by a Rockwell Automation support representative.

Set the Expected Packet Rate here.

Set the number of Transmit Retries here.

Click here for new settings to take effect.

Add and remove I/O modules to and from the scanlist on this screen.

To set any of the parameters on this screen (e.g. Node Active) for a specific module, first highlight the module and then make specific changes.

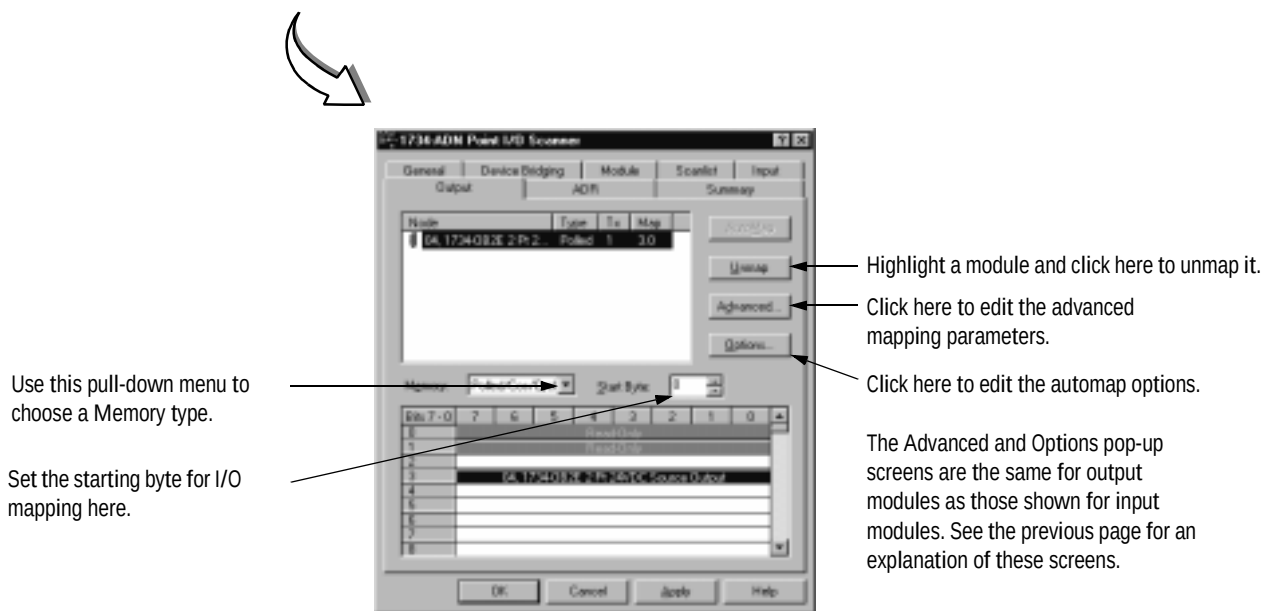
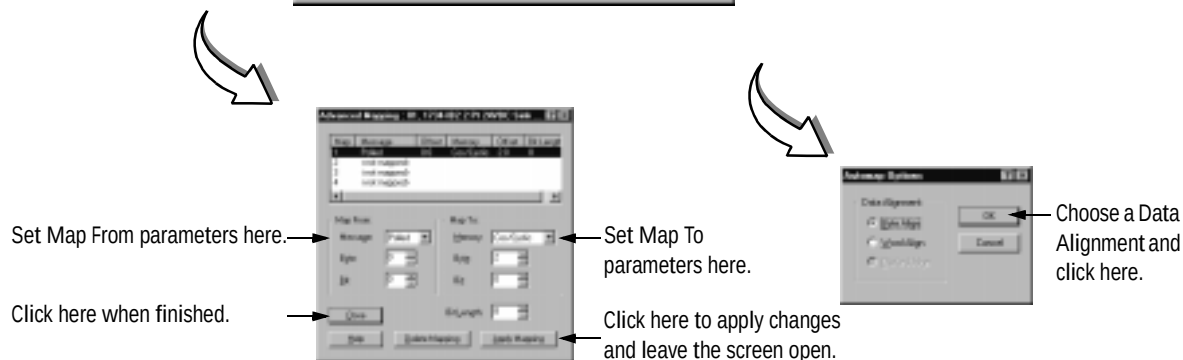
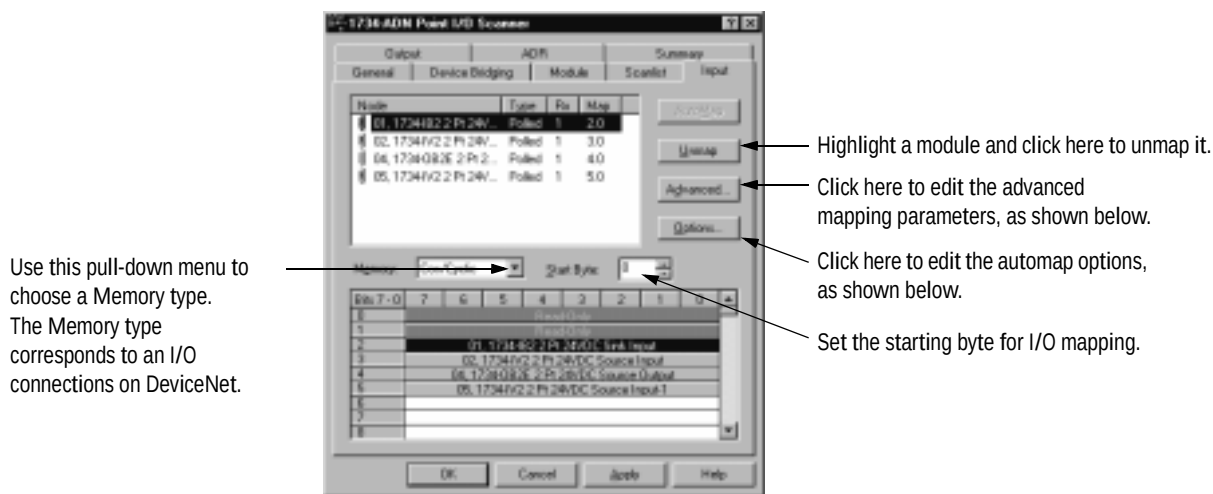
Make sure you autopmap when adding modules.

Click here to edit the module's I/O parameters, as shown below.

Choose electronic keying parameters for each module.

Click on the appropriate I/O data transmission method (e.g. Polled) and make changes on this screen.

Click here when finished.

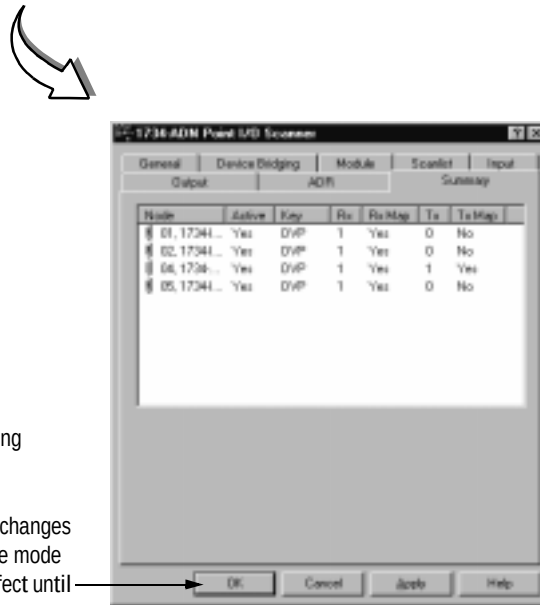


The screens below show the remaining configuration tabs.

Use this screen to choose Automatic Device Replacement options.



You cannot change any configuration parameters on this screen. It is shown here to maintain the software's graphical integrity.



Click here when finished setting configuration parameters.

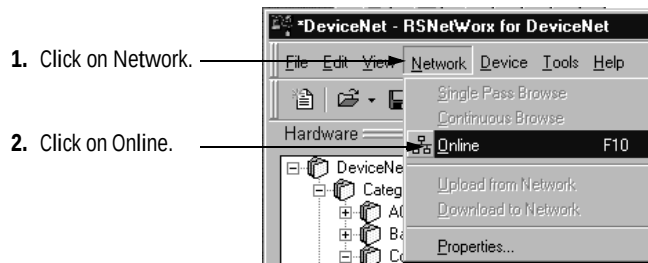
IMPORTANT: Configuration changes made in offline mode do not take effect until the scanner goes online. For more information on how the scanner goes online, see page 4-8.

This completes the configuration options. Your adapter must go online for configuration changes to take effect.

Going Online

After you set configuration parameters, your adapter must go online. Follow these steps:

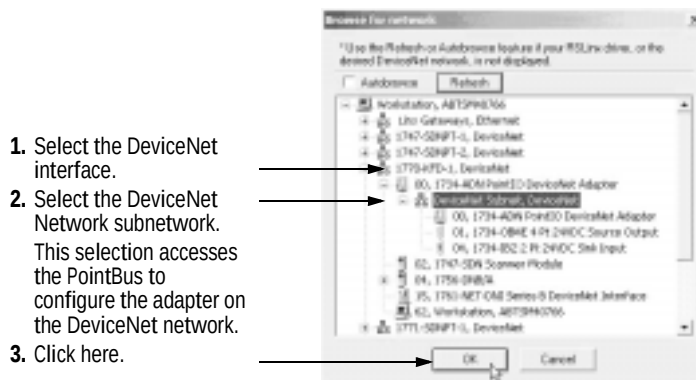
1. Use the Network pull-down to go online.



The software prompts you to save your configuration changes.



2. Choose your adapter's network as shown below.



3. Apply the data to your adapter.

Chapter Summary and What's Next

In this chapter, you learned how to configure the adapter. Move to Chapter 4 to learn how to configure your adapter.

Notes:

Configuring the 1734-ADN Adapter for DeviceNet

This chapter describes how to custom configure your adapter for use with DeviceNet devices..

For more information about:	See page:
Configuration Overview	5-1
Adding the Adapter to Your Network	5-2
Setting the Adapter's Parameters	5-3
Going Online	5-6
Chapter Summary and What's Next	5-6

Your adapter works on two networks simultaneously and must be configured for each separately, including separate RSNetWorx for DeviceNet software files.

This chapter explains configuration of the adapter for use on the DeviceNet network. For information on how to configure the adapter for use on the PointBus see Chapter 4, Configuring the 1734-ADN Adapter for DeviceNet.

Configuration Overview

You must use the RSNetWorx for DeviceNet software to configure your adapter. You can configure the adapter while it is:

- online
- or
- offline

This chapter shows configuration in the offline mode. Configuration screens appear the same in both modes. The only difference is that if you make changes offline, you must take the adapter online before the configuration changes take effect.

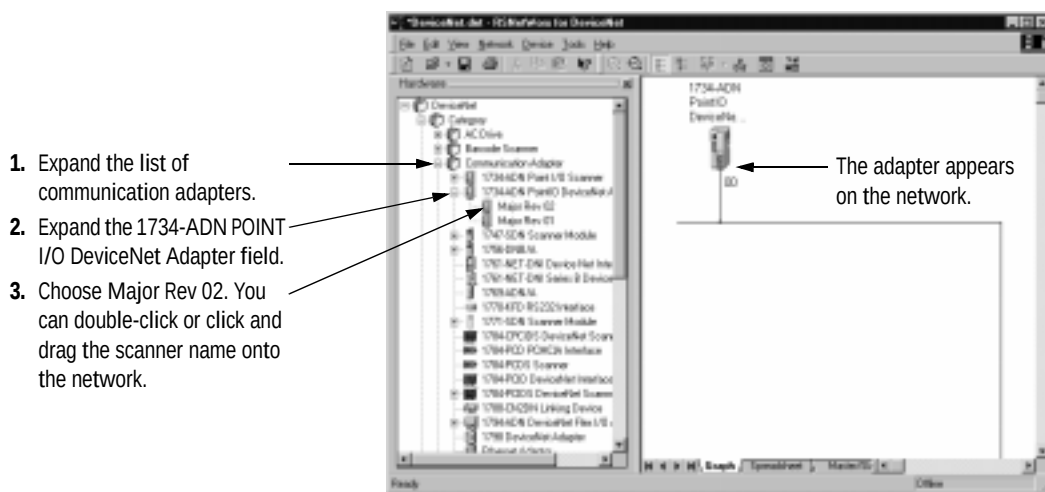
You must follow these steps during configuration:

1. Adding the Adapter to Your Network
2. Setting the Adapter's Parameters
3. Going Online

Adding the Adapter to Your Network

Follow these steps:

1. Start the RSNetWorx for DeviceNet software.
2. Add the adapter as shown below.



IMPORTANT

The adapter must always exist on the PointBus at Node 00.

Setting the Adapter's Parameters

After adding it to the network, you must configure the adapter for use with master DeviceNet devices.

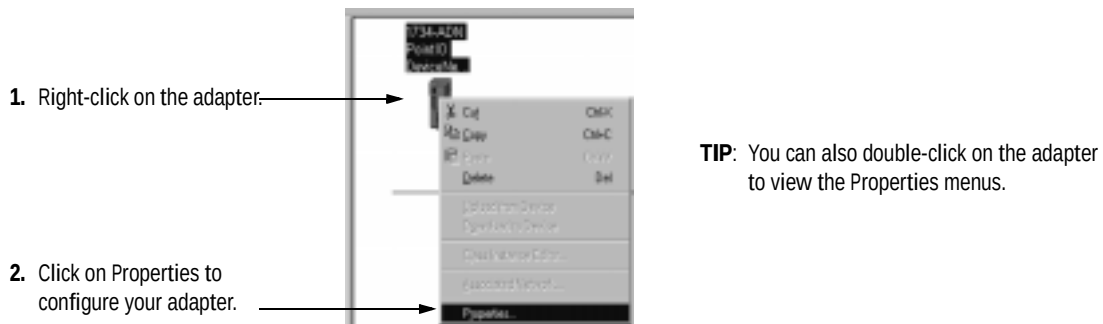
IMPORTANT

This chapter shows configuration in the offline mode. Changes set in this mode do not take effect immediately. For configuration changes to take place, you must:

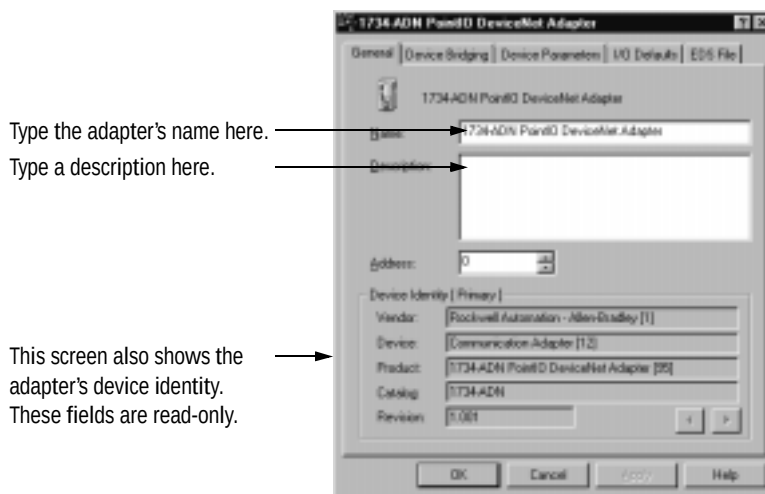
- go online with your adapter
- download the new configuration to your adapter

For more information on how to go online, see page 5-6.

1. Configure the adapter as shown below.



You see a pop-up screen with a series of tabs. Each tab provides options to write configuration for your adapter. The tabs are shown below and on the following pages.



Use Associate File to associate this configuration file (i.e. configuring the 1734-ADN for communication with DeviceNet) with the configuration file that configures the same 1734-ADN for communication with POINT I/O modules.

For more information on the need to maintain two configuration files in the same adapter, and the simultaneous presence of the adapter on two networks (i.e. DeviceNet as a slave and PointBus as a master), see page 3-1.



Use Clear Association to remove previously established configuration file associations that no longer apply to your adapter.

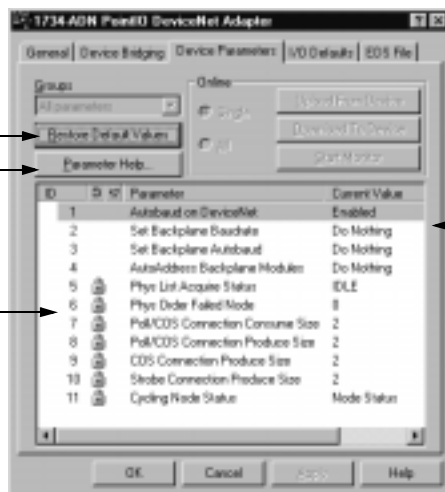


Restore all parameter default values.

For a description of a specific parameter, highlight the parameter below and click here.

Any parameter with a lock shown before it cannot be changed.

The screens below show how to change the other parameters.



IMPORTANT: The following configuration parameters:

- Autobaud on DeviceNet
- Set Backplane Baudrate
- Set Backplane Autobaud
- AutoAddress Backplane Modules

should be set to Do Nothing when Download All Parameters is selected or when saving to a scanner's ADR data.

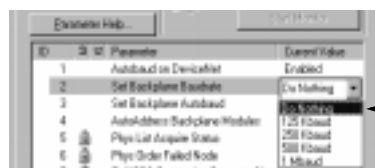
AutoAddress

Enable or disable autoaddress



Backplane Baudrate

Set the backplane baudrate.



Backplane Autobaud

Configure backplane modules to autobaud.



AutoAddress Backplane Modules

Choose the autoaddress



The screens below show the remaining configuration tabs.

The I/O Defaults are not listed when the adapter is in offline mode. This screen is shown here for graphical integrity and is typically only used when the adapter is online.



Click here to view the EDS file. An example of the EDS file is shown below.



The screen below shows an example EDS file.

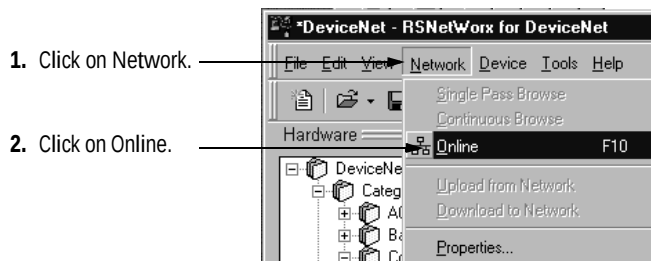


This completes the configuration options. Your adapter must go online for configuration to take effect.

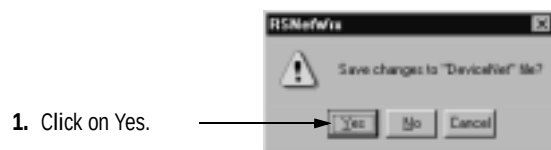
Going Online

Follow these steps for the adapter to go online:

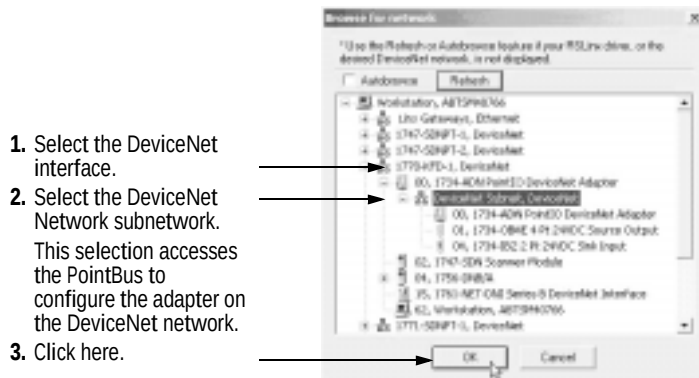
1. Use the Network pull-down.



The software prompts you to save your configuration changes.



2. Choose your adapter's network as shown below.



3. Apply the data to your adapter.

Chapter Summary and What's Next

In this chapter, you learned how to configure the adapter. Move to Chapter 5 to learn how communication and image table mapping occurs through your adapter.

Communication and I/O Image Table Mapping

This chapter describes the communication process and I/O image table mapping as they occur through the 1734-ADN adapter.

For more information about:	See page:
Communicating Through the Adapter	6-1
Overview of the Communication Process	6-2
Image Table Mapping	6-5
Communicating with I/O Modules	6-7
Chapter Summary and What's Next	6-10

Communicating Through the Adapter

As described previously in this manual, the adapter resides on the DeviceNet network and the PointBus simultaneously. The adapter's functions are as follows:

- DeviceNet – adapter serves as a slave device that exchanges I/O data with another DeviceNet scanner device (e.g. 1771-SDN) via DeviceNet messages
- PointBus – adapter serves as master for up to 63 I/O modules, using DeviceNet messages to solicit data from or deliver data to each module

IMPORTANT

If Automatic Device Replacement (ADR) is enabled on the adapter, you can only connect up to 62 modules via the PointBus.

For more information on ADR, see page 3-15.

Mapping Data

Your adapter must store data temporarily before transferring it between devices. You must map data to your adapter's memory before transferring it.

For a detailed description of the mapping process, see page 6-5.

Overview of the Communication Process

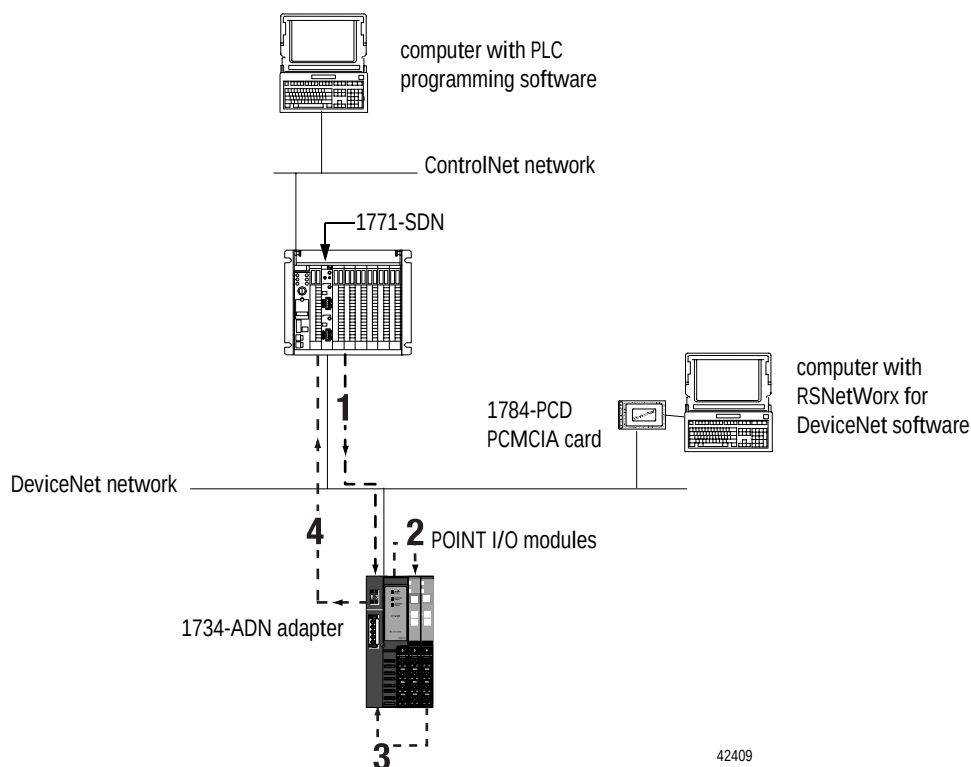
In a typical configuration, the adapter acts as an interface between a DeviceNet scanner (e.g. 1771-SDN) and POINT I/O modules. The example graphic below shows information transferred from a 1771-SDN to POINT I/O modules.

IMPORTANT

Although information is exchanged between the 1771-SDN and PLC-5, this diagram (nor this chapter) is not designed to explain such an exchange.

Four data transfers are shown in the diagram, including:

1. Scanner to adapter
2. Adapter to I/O modules
3. I/O modules to adapter
4. Adapter to scanner



The computers and PCMCIA card shown in the diagram are required to configure the processor, adapter and I/O modules.

Although the PCMCIA card is used in this example, you can use other communications cards, such as PCID and KFD cards.

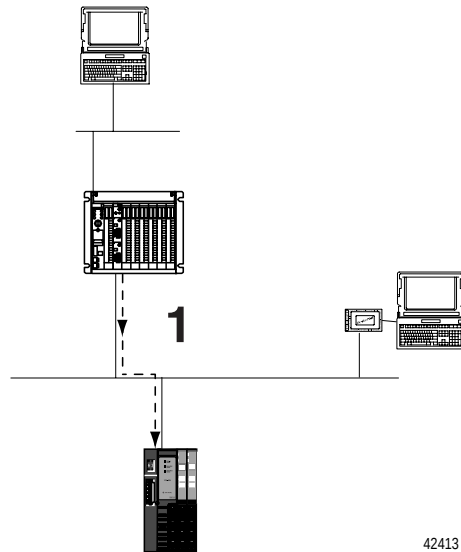
Because the adapter simultaneously resides on the DeviceNet network and on PointBus, it serves as a slave to the processor (i.e. #1 & 4) and a master to the I/O modules (i.e. #2 & 3).

The four data transfers are not necessarily sequential and are explained in greater detail on the following pages.

1771-SDN to Adapter

Key Points About Transfer

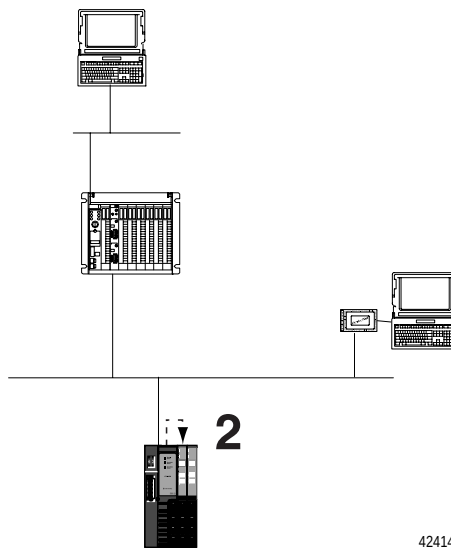
1. SDN is master, adapter is slave
2. Processor initiates transfer
3. Processor uses DeviceNet I/O messaging to write data to adapter. Data may contain:
 - device output data
 - configuration data



Adapter to Output Module

Key Points About Transfer

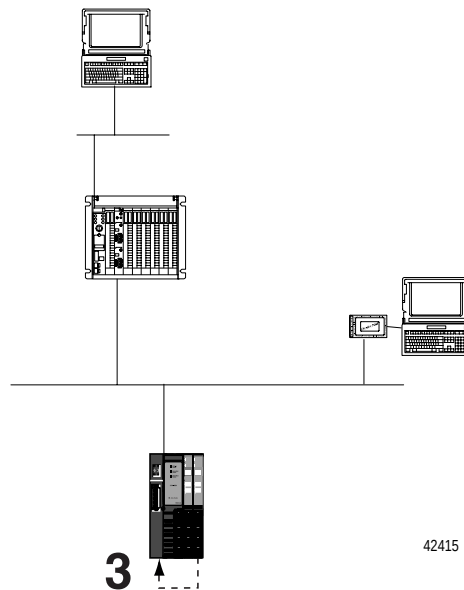
1. Adapter is master, I/O module is slave
2. Adapter initiates transfer
3. Adapter produces data for I/O module to consume. Data may contain:
 - device output data
 - configuration data



Input Module to Adapter

Key Points About Transfer

1. Adapter is master, I/O module is slave
2. Adapter initiates transfer (unless module is in COS mode).
3. Adapter consumes data I/O module has produced. Data may contain:
 - device input data
 - status data



Adapter to 1771-SDN

Key Points About Transfer

1. SDN is master, adapter is slave
2. SDN initiates transfer (except for COS connections)
3. SDN consumes I/O data produced by adapter. Data may contain:
 - device input data
 - status data

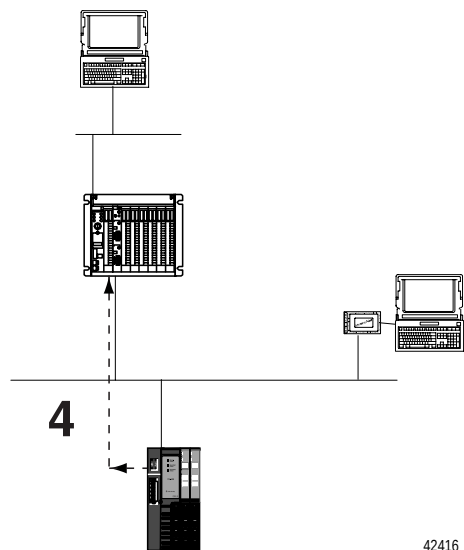


Image Table Mapping

Your adapter receives data from:

- master devices (e.g. scanners) - output data is then passed to POINT I/O modules
- input modules - input data is passed to the scanner

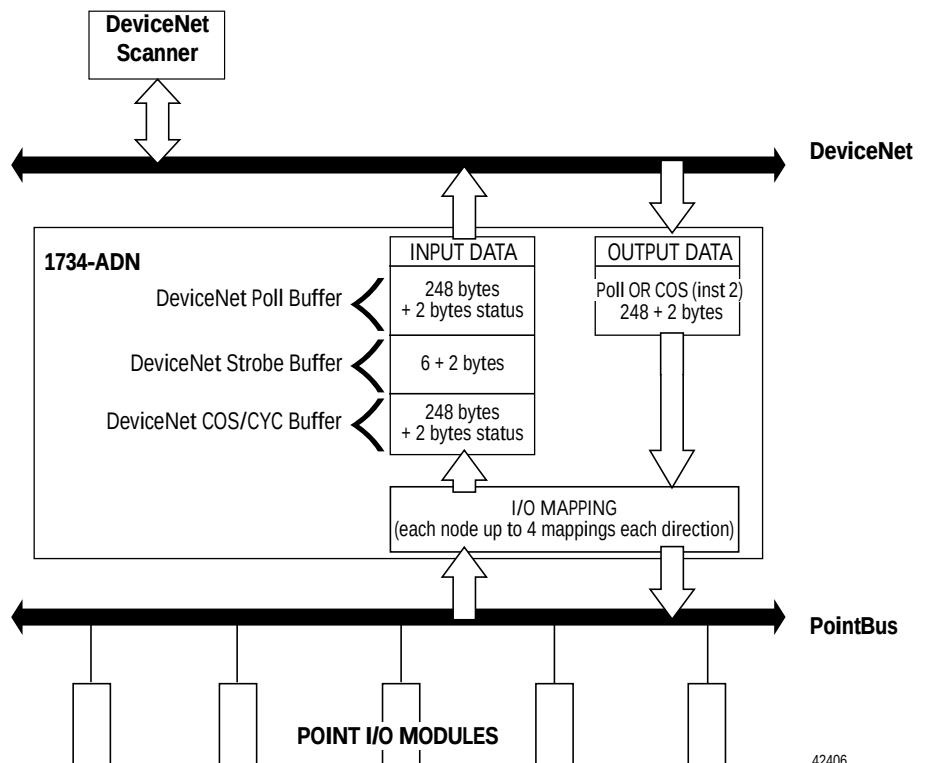
The adapter must map the data it receives to its internal memory before passing it to the appropriate device. The I/O map for a module is divided into:

- read bytes - input and status bytes
- write bytes - output and configuration bytes

The data is mapped by 3 buffers for input data (each representing an I/O connection) and 1 buffer for output data (representing data sent for Poll or COS connections).

The number of read bytes or write bytes can be 2 or more. The length of each I/O module's read bytes and write bytes vary in size depending on module complexity. Each I/O module supports at least 1 input byte or 1 output byte. Status and configuration are optional, depending on the module.

The graphic below shows how the adapter maps information.



42406

See Table 6.A for definitions of the first 2 bytes of each I/O message produced by the adapter on DeviceNet.

Table 6.A
I/O Status Word Bit Definitions

	Bit	Operating Mode	Operating Mode Description
Byte 0	0	0 = Run mode 1 = Idle mode	Run - The adapter maps output data to each module on PointBus.
	1	1 = Device failure (at least one device failed)	Idle - Output data with zero length is sent to I/O modules.
	2	1 = Communication failure	
	3	1 = Duplicate node address failure	Failure - One or more of the devices in the scan list has failed to communicate with the adapter.
	4	1 = Physical order failure	
	5	Reserved	Communications Failure - There are no communications on on the PointBus.
	6	Reserved	
	7	Reserved	Duplicate Node Address Failure - There is another node with the same address as the scanner on PointBus, and the adapter has failed its DupMAC test. Physical Order Failure - A node has appeared on PointBus in an unexpected physical location.
Byte 1	0	Reserved	
	1	Reserved	
	2	Reserved	
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	Reserved	
	7	Reserved	

The first 2 bytes of output data on the DeviceNet network that are sent to the adapter are reserved as a command word. No bits have been defined.

Communicating with I/O Modules

The adapter module supports multiple communication choices. These choices all use the default I/O structure previously described. The adapter's master (e.g. 1771-SDN) makes the actual communication choice. The choices are:

- Polled – Adapter sends data in response to received data.
- Strobe – Adapter sends data in response to the strobe command. The single bit allocated to the adapter in the strobe message is not used. If the configured size of the input data (sent from the adapter) is greater than 8 bytes, the strobe connection establishment will fail. In this case, the input size must be reconfigured to 8 bytes or less (only 6 bytes are I/O data because the first 2 bytes are the status word).
- Change of State – Adapter sends data based on detection of any changed value within the input data. Data is independently received based on change of state from the sender. Data in both directions can be acknowledged or unacknowledged depending on the run time configuration of the system.
- Cyclic – Adapter sends data cyclically based on a configured time value. Data is independently received cyclically from the sender. Data in both directions can be acknowledged or unacknowledged depending on the run time configuration of the system.

The adapter uses these messages to solicit data from or deliver data to each device. Data received from the devices (i.e. input data) is organized by the adapter and retransmitted to the master. Data received from the master (i.e. output data) is organized in the adapter and sent on to the I/O modules.

Using Diagnostic Tables

The adapter maintains three diagnostic tables to manage the flow of data between a processor and a network's devices. You can access the table over DeviceNet through the Scan Config Object (Class Code 0x90), Instance 1, via the following read-only attributes:

- **Faulted Node Table (Attribute 0xA)** - In this 8-byte table, each bit represents a node on the backplane. For example, bit 0 in byte 0 represents MACID 0 (the adapter), while bit 0 in byte 1 represents MACID 8 and so on. If a bit is set, a corresponding non-zero status value can be read from the Node State Table described below.
- **Idle Node Table (Attribute 0xB)** - In this 8-byte table, each bit also represents a node on the backplane, as with the Faulted Node Table. If a bit is set in the Idle Node Table, the corresponding node is in the scanlist and currently in idle mode.
- **Node Status Table (Attribute 0xC)** - This 64 byte table contains a status code for each possible MACID on the backplane. Non-zero values are accompanied with the respective bit in the Faulted Node Table being set.

See Table 6.B for an explanation of the text messages associated with the Node Status Table.

Table 6.B
Node Status Table Numeric Code Definitions

Numeric Code:	Text Message:	Definition:	Take this action:
70	DupMAC Failure	Adapter failed Duplicate Node Address check.	An I/O module has a MACID of zero. Change the module's address.
71	Scanner Cfg Error	Illegal data in the scan list table.	Reconfigure the scan list table and remove any illegal data.
72	Comm Failure	Slave device stopped communicating.	Inspect the I/O modules and verify connections.
73	Wrong Device Type	Device's identity information does not match electronic key in scan list table entry.	Verify that the correct device is at this node number. Make sure that the device matches the desired electronic key (vendor, product code, product type)
74	Port Overrun Error	Data overrun on port detected.	Modify your configuration and check for invalid data. Check network communication traffic.
75	Network Failure	Communication has ceased on the backplane.	Inspect the I/O modules and verify connections.
76	No Msg for Scanner	No direct network traffic for scanner detected.	No action. The scanner hears other network communication.
77	Wrong Data Size	Data size expected by the device does not match scan list entry.	Reconfigure your module for correct transmit and receive data sizes

Table 6.B
Node Status Table Numeric Code Definitions

Numeric Code:	Text Message:	Definition:	Take this action:
78	No Such Device	Slave device in scan list table does not exist.	Add the device to the network, or delete scan list entry for that device.
79	Transmit Failure	Adapter has failed to transmit a message.	Make sure that other modules exist on the backplane.
80	In Idle Mode	Adapter is in IDLE mode.	No action necessary. If you want the adapter to run, put it in RUN mode.
82	Fragmentation Error	Error detected in sequence of fragmented I/O messages from device	Check scan list table entry for slave device to make sure that input and output data lengths are correct. Check slave device configuration.
83	Slave Init Error	Slave device is returning error responses when scanner attempts to communicate with it.	Check accuracy of scan list table entry. Check slave device configuration. Slave device might be in another master's scan list. Reboot slave device.
84	Not Yet Initialized	Adapter is initializing the DeviceNet channel.	No action.
85	Rcv Buffer Overflow	Data size is larger than 255 bytes.	Configure the device for a smaller data size.
86	Device Went Idle	Device is producing zero length data (idle state) while channel is in Run Mode.	Check device configuration and slave node status.
89	ADR Failed	Failure occurred when downloading ADR data to the I/O module.	Reconfigure the ADR download data for the I/O module.
91	Port Bus Off	Bus-off condition detected on communications port. Scanner is detecting communications errors.	Check DeviceNet connections and physical media integrity. Check system for failed slave devices or other possible sources of network interference.
92	Port Power Off	No network power detected on communications port.	Provide network power. Make sure that scanner drop cable is providing network power to adapter communications port.

A user program can monitor the *Device Failure Bit* in the I/O message(s) received from the adapter. When it is determined the bit set, you can read the *Faulted Node Table* and *Node Status Table*, using the Explicit Message Program Control Feature of the scanner device, to determine the module experiencing problems and the nature of those problems.

Chapter Summary and What's Next

In this chapter, you learned about adapter communication and I/O image table mapping. Move to Chapter 6 to learn how to troubleshoot your adapter.

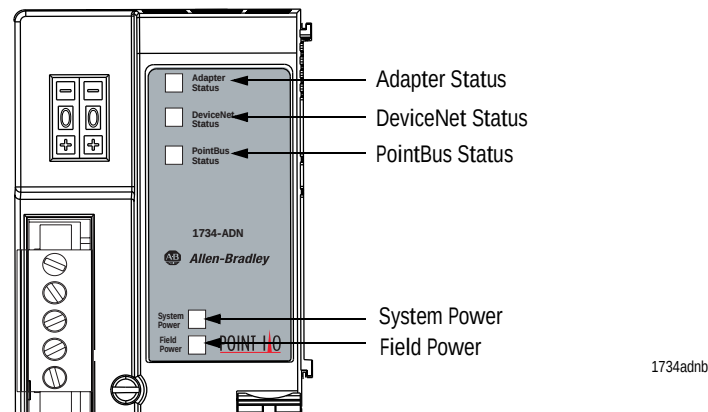
Troubleshooting the 1734-ADN Adapter

This chapter describes how to troubleshoot your adapter.

To learn how to:	See page:
Use the Status Indicators	7-1
Use Guidelines for Using Your Adapter	7-3
Chapter Summary and What's Next	7-4

Use the Status Indicators

You can use the status indicators to troubleshoot your adapter. The graphic below shows the adapter's status indicators.



Use the table below to troubleshoot your adapter.

Indicator:	Indication:	Probable Cause:	Take This Action:
System Power	Off	Any of the following: 1. Not active 2. Field power is OFF 3. DC-DC converter problem	1. Check adapter configuration 2. Turn field power ON 3. Check DC-DC converter
	Green	Any of the following: 1. System power ON 2. DC-DC converter active (5V)	None

Indicator:	Indication:	Probable Cause:	Take This Action:
Field Power	Off	Any of the following: 1. Not active 2. Field power is OFF	1. Check adapter configuration 2. Turn field power ON
	Green	Power ON, 24V present	None
Adapter Status	Off	No power applied to device	Power the adapter
	Green	Device operating normally	None
	Flashing Green	Device needs to be commissioned because configuration is missing, incomplete or incorrect.	Check configuration and recommission the adapter
	Flashing Red	Recoverable fault.	Make sure the adapter does not need a FLASH update.
	Red	Unrecoverable fault may require device replacement	Replace the adapter
	Flashing Red/ Green	Device is in self-test	Wait for self-test to finish
DeviceNet Status	Off	Device is not online - Device is autobauding - Device has not completed dup_MAC_id test. - Device not powered	Check adapter status indicator to determine if more time is needed to complete the dup_MAC_id test or if the adapter needs to be powered
	Flashing Green	Device is on-line but has no connections in the established state.	None
	Green	Device on-line and has connections in the established state.	None
	Flashing Red	One or more I/O connections in timed-out state	Determine the cause of the time-out. The EPR may need to be increased.
	Red	Critical link failure - failed communication device. Device detected error that prevents it communicating on the network.	Make sure the device is using the correct MAC ID and baudrate

Indicator:	Indication:	Probable Cause:	Take This Action:
PointBus Status	Off	Device is not on-line - Device has not completed Dup_MAC_ID test. - Device not powered - check module status indicator	Check adapter status indicator to determine if more time is needed to complete the dup_MAC_id test or if the adapter needs to be powered
	Flashing Green	Device is online but has no connections in the established state.	None
	Green	Device on-line and has connections in the established state.	None
	Flashing Red	No scanlist is available. I/O module is missing	Make sure all I/O modules are connected and using the correct MAC IDs. Check "Cycling Node Status" parameter in RSNetWorx for DeviceNet.
	Red	Critical link failure - failed communication device. Device detected error that prevents it communicating on the network.	Make sure an I/O module is not using a MAC ID =0. Make sure all backplane modules are communicating at the proper baudrate.

Guidelines for Using Your Adapter

Remember the following operational guidelines when using your 1734-ADN adapter.

- Do not leave spaces in the I/O. Instead, install all POINT I/O modules adjacent to each other.

IMPORTANT

If you must leave an I/O space open temporarily, make sure you change the keying position on the mounting base (1734-MB) to #5. This position will prevent you from installing the wrong I/O module on the base.

- Populate every position on the DIN rail.

- Do not add new I/O module to the end of the POINT I/O system while the system is under power.
- Use both labels with the I/O modules and removable terminal blocks (RTBs).
- Do not separate I/O modules and RTBs with the same number.
- Do not move I/O modules to different locations on the DIN rail after they have been installed and configured. You should always place modules with the matching RTB.
- If adjacent modules (i.e. 2 or more) are removed, replace all of them to operate the POINT I/O system. Input data will hold last state until all previously-removed modules are replaced.
- Use Allen-Bradley marker cards to identify your POINT I/O modules. The cards are easily ordered from your Rockwell Automation representative under the Bulletin 1492 number.

Chapter Summary and What's Next

In this chapter you learned how to troubleshoot your adapter. Move to Appendix A to see specifications for your adapter.

Specifications

Specifications - 1734-ADN DeviceNet Adapter Module

Communication Interface Specifications

Expansion I/O Capacity	Up to 13 modules (13 times 75mA = 0.975, just under the limit of 1.0A). The actual number of modules can vary. Add up the current requirements of the modules you want to use to make sure they do not exceed the amperage limit of the 1734-ADN. (Note: Total expansion up to 63 modules - 13 modules maximum with 1734-ADN - add 1734-EP24DC modules for an additional 17 modules (or less based on current requirements), up to 63 module maximum) <table> <tr> <th>Cat. No.</th><th>PointBus Current Requirements</th></tr> <tr><td>1734-IB2</td><td>75mA</td></tr> <tr><td>1734-IB4</td><td>75mA</td></tr> <tr><td>1734-IV2</td><td>75mA</td></tr> <tr><td>1734-IV4</td><td>75mA</td></tr> <tr><td>1734-OB2E</td><td>75mA</td></tr> <tr><td>1734-OB4E</td><td>75mA</td></tr> <tr><td>1734-OW2</td><td>80mA</td></tr> <tr><td>1734-IE2C</td><td>75mA</td></tr> <tr><td>1734-OE2C</td><td>75mA</td></tr> <tr><td>1734-IE2V</td><td>75mA</td></tr> <tr><td>1734-OE2V</td><td>75mA</td></tr> <tr><td>1734-IA2</td><td>75mA</td></tr> <tr><td>1734-IM2</td><td>75mA</td></tr> <tr><td>1734-OA2</td><td>75mA</td></tr> <tr><td>1734-IJ2</td><td>160mA</td></tr> <tr><td>1734-IK2</td><td>160mA</td></tr> <tr><td>1734-IR2</td><td>220mA</td></tr> <tr><td>1734-IT2</td><td>175mA</td></tr> <tr><td>1734-VHSC5</td><td>180mA</td></tr> <tr><td>1734-VHSC24</td><td>180mA</td></tr> </table>	Cat. No.	PointBus Current Requirements	1734-IB2	75mA	1734-IB4	75mA	1734-IV2	75mA	1734-IV4	75mA	1734-OB2E	75mA	1734-OB4E	75mA	1734-OW2	80mA	1734-IE2C	75mA	1734-OE2C	75mA	1734-IE2V	75mA	1734-OE2V	75mA	1734-IA2	75mA	1734-IM2	75mA	1734-OA2	75mA	1734-IJ2	160mA	1734-IK2	160mA	1734-IR2	220mA	1734-IT2	175mA	1734-VHSC5	180mA	1734-VHSC24	180mA
Cat. No.	PointBus Current Requirements																																										
1734-IB2	75mA																																										
1734-IB4	75mA																																										
1734-IV2	75mA																																										
1734-IV4	75mA																																										
1734-OB2E	75mA																																										
1734-OB4E	75mA																																										
1734-OW2	80mA																																										
1734-IE2C	75mA																																										
1734-OE2C	75mA																																										
1734-IE2V	75mA																																										
1734-OE2V	75mA																																										
1734-IA2	75mA																																										
1734-IM2	75mA																																										
1734-OA2	75mA																																										
1734-IJ2	160mA																																										
1734-IK2	160mA																																										
1734-IR2	220mA																																										
1734-IT2	175mA																																										
1734-VHSC5	180mA																																										
1734-VHSC24	180mA																																										
DeviceNet Communication Rate	125K bit/s (500m maximum) 250K bit/s (250m maximum) 500K bit/s (100m maximum)																																										
DeviceNet Cable	Allen-Bradley part number 1485C-P1-Cxxx Refer to publication DN-2.5 for more information																																										
Module Location	Starter module - left side of 1734 system																																										

DeviceNet Power Specifications

Power Supply	Note: In order to comply with CE Low Voltage Directives (LVD), you must use a Safety Extra Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this adapter.
Input Voltage Rating	24V dc nominal
DeviceNet Input Voltage Range	11-25V dc DeviceNet specification
Input Overvoltage Protection	Reverse polarity protected
DeviceNet Power Requirements	24V dc (+4% = 25V dc max) @ 30mA maximum

Power Supply Specifications

Power Supply	Note: In order to comply with CE Low Voltage Directives (LVD), you must use either a NEC Class 2, a Safety Extra Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this adapter. A SELV supply cannot exceed 30V rms, 42.4V peak or 60V dc under normal conditions and under single fault conditions. A PELV supply has the same rating and is connected to protected earth.
Input Voltage Rating	24V dc nominal 10-28.8V dc range
Field Side Power Requirements	24V dc (+20% = 28.8V dc maximum) @ 400mA maximum
Inrush Current	6A maximum for 10ms
PointBus Output Current	1A maximum @ 5V dc $\pm 5\%$ (4.75 - 5.25)
Input Overvoltage Protection	Reverse polarity protected
Interruption	Output voltage will stay within specifications when input drops out for 10ms at 10V with maximum load.

General Specifications

Indicators	3 red/green status indicators Adapter status DeviceNet status PointBus status 2 green power supply status indicators: System Power (PointBus 5V power) Field Power (24V from field supply)
Power Consumption	8.1W maximum @ 28.8V dc
Power Dissipation	2.8W maximum @ 28.8V
Thermal Dissipation	9.5 BTU/hr maximum @ 28.8V dc
Isolation Voltage	1250V rms/V ac
Field Power Bus	
Nominal Voltage	24V dc
Supply Voltage Range	10-28.8V dc range,
Supply Current	10A maximum

Dimensions Inches (Millimeters)	3.0H x 2.16W x 5.25L (76.2H x 54.9W x 133.4L)
Environmental Conditions	
Operational Temperature	-20 to 55°C (-4 to 131°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	5 to 95% noncondensing
Shock	30g peak acceleration, 11(±1)ms pulse width
Operating	50g peak acceleration, 11(±1)ms pulse width
Non-operating	Tested 5g @ 10-500Hz per IEC 68-2-6
Vibration	
Conductors Wire Size	14 AWG (2.5mm ²) - 22 AWG (0.25mm ²) solid or stranded maximum 3/64 inch (1.2mm) insulation maximum
Category	2 ¹
Terminal Base Screw Torque	5-7 pound-inches (0.5-0.6Nm)
Field Wiring Terminations	
DeviceNet	1 - Black Wire -V 2 - Blue Wire CAN Low 3 - Bare Wire Shield 4 - White Wire CAN High 5 - Red Wire +V
Power Supply	0 - No Connection 1 - No Connection 2 - Chassis Ground 3 - Chassis Ground 4 - Common 5 - Common 6 - Supply 7 - Supply
Mass	9.0 oz/255 grams
Agency Certification (when product is marked)	CE marked for all applicable directives C-Tick marked for all applicable acts DeviceNet compatible as certified by ODVA, Inc.

¹ Use this conductor category information for planning conductor routing as described in publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines."

Notes:

Default Data Maps

I/O messages are sent to (consumed) and received from (produced) the POINT I/O modules. These messages are mapped into the processor's memory. This appendix lists the default data maps for 1734 POINT I/O and 1734-POINTBlock modules.

For the default data map of:	See page:
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1734-IA2 Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)							Ch1	Ch0
Consumes (scanner Tx)	No consumed data							
Where: Ch0 = channel 0, Ch1 = channel 1; 0 = off, 1 = on								

1734-IB2 Sink Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)							Ch1	Ch0
Consumes (scanner Tx)	No consumed data							
Where: Ch0 = channel 0, Ch1 = channel 1; 0 = OFF 1 = ON								

1734-IB4 Sink Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)					Ch3	Ch2	Ch1	Ch0
Consumes (scanner Tx)	No consumed data							
Where: Ch0 = input channel 0 Ch3 = channel 3								
Ch1 = input channel 1 0 = OFF			Ch2 = input channel 2 1 = ON					

1734-IV2 Source Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)							Ch1	Ch0
Consumes (scanner Tx)	No consumed data							
Where: Ch0 = input channel 0 data Ch1 = input channel 1 data								

1734-IV4 Source Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)					Ch3	Ch1	Ch1	Ch0
Consumes (scanner Tx)	No consumed data							
Where: Ch0 = input channel 0 Ch3 = input channel 3								
Ch1 = input channel 1 Ch2 = input channel 2								

1734-OA2 Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Produces (scanner Rx)	No produced data								
Consumes (scanner Tx)	Not used						Ch 1	Ch 0	Channel state
Where: 0 = Off, 1 = On									

1734-OB2E Electronically Protected Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Produces (scanner Rx)	Not used						Ch1	Ch0	Channel status
Where: 0 = no error 1 = error									

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Consumes (scanner Tx)	Not used						Ch1	Ch0	Channel state
Where: 0 = OFF 1 = ON									

1734-OB4E Electronically Protected Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Produces (scanner Rx)	Not used				Ch3	Ch2	Ch1	Ch0	Channel status
Where: 0 = no error 1 = error									

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Consumes (scanner Tx)	Not used				Ch3	Ch2	Ch1	Ch0	Channel state
Where: 0 = Off 1 = On									

Message size: 1 Byte

Where: 0 = OFF 1 = ON

Message size: 6 Bytes

Where: CF = Channel Fault status	0 = no error	1 = fault
CM = Calibration Mode	0 = normal	1 = calibration mode
LA = Low Alarm	0 = no error	1 = fault
HA = High Alarm	0 = no error	1 = fault
LLA = Low/Low Alarm	0 = no error	1 = fault
HHA = High/High Alarm	0 = no error	1 = fault
UN = Underrange	0 = no error	1 = fault
OR = Overage	0 = no error	1 = fault

Table B.A Channel Status Byte

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Over Range	Under Range	High High Alarm	Low Low Alarm	High Alarm	Low Alarm	CAL Mode	Channel Fault

1734-IE2V Analog Input Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Input Channel 0 - High Byte								Input Channel 0 - Low Byte							
	Input Channel 1 - High Byte								Input Channel 1 - Low Byte							
	Status Byte for Channel 1								Status Byte for Channel 0							
	OR	UR	HH A	L LA	HA	LA	CM	CF	OR	UR	HH A	L LA	HA	LA	CM	CF
Consumes (scanner Tx)	No consumed data															

Where: CF = Channel Fault status; 0 = no error, 1 = fault
CM = Calibration Mode; 0 = normal, 1 = calibration mode
LA = Low Alarm; 0 = no error, 1 = fault
HA = High Alarm; 0 = no error, 1 = fault
LLA = Low/Low Alarm; 0 = no error, 1 = fault
HHA = High/High Alarm; 0 = no error, 1 = fault
UR = Underrange; 0 = no error, 1 = fault
OR = Overrange; 0 = no error, 1 = fault

1734-OE2C Analog Current Output Module

Message size: 4 bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Consumes (Tx)	Output Channel 0 High Byte								Output Channel 0 Low Byte							
	Output Channel 1 High Byte								Output Channel 1 Low Byte							

Message size: 2 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (Rx)	High Byte - Channel 1 Status								Low Byte - Channel 0 Status							
	Not used				H C A	LC A	C M	CF	Not used				H C A	LC A	C M	CF

Where: CF = Channel Fault status 0 = no error 1 = fault
 CM = Calibration Mode 0 = normal 1 = calibration mode
 LCA = Low Clamp Alarm 0 = no error 1 = fault
 HCA = High Clamp Alarm 0 = no error 1 = fault

Channel Status

Table B.B
Channel Status Byte

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Not used				High Clamp	Low Clamp	CAL Mode	Channel Fault

1734-OE2V Analog Output Module

Message size: 2 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 1 Status - High Byte								Channel 0 Status - Low Byte							
	Not used				HC A	LC A	CM	ST	Not used				HC A	LC A	CM	ST

Where: ST = Channel Fault Status; 0 = no error, 1 = fault
 CM = Calibration Mode; 0 = normal, 1 = calibration mode
 LCA = Low Clamp Alarm; 0 = no error, 1 = fault
 HCA = High Clamp Alarm; 0 = no error, 1 = fault

1734-IJ Encoder/Counter Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 0 value of present counter state (LSW)															
	Channel 0 value of present counter state (MSW)															
	PE	EF	NR	0	0	0	0	0	0	ZS	BS	AS	C1	C0	ZD	0

Where: PE = Programming error
 EF = EEPROM fault status
 NR = Not ready status bit
 ZS = Z input status
 BS = B input status
 AS = A input status
 C = Stored data count
 ZD = Zero frequency detected
 LSW = Least significant word
 MSW = Most significant word

1734-IK Encoder/Counter Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 0 value of present counter state (LSW)															
	Channel 0 value of present counter state (MSW)															
	PE	EF	NR	0	0	0	0	0	0	ZS	BS	AS	C1	C0	ZD	0

Where: PE = Programming error
 EF = EEPROM fault status
 NR = Not ready status bit
 ZS = Z input status
 BS = B input status
 AS = A input status
 C = Stored data count
 ZD = Zero frequency detected
 LSW = Least significant word
 MSW = Most significant word

1734-IM2 Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (Rx)							Ch 1	Ch 0
Consumes (Tx)	No consumed data							
Where: Ch0 = channel 0, ICh1 = channel 1; 0 = off, 1 = on								

1734-IR2 RTD Input Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Input Channel 0 - High Byte								Input Channel 0 - Low Byte							
	Input Channel 1 - High Byte								Input Channel 1 - Low Byte							
	Status Byte for Channel 1								Status Byte for Channel 0							
	OR	UR	HH A	L LA	HA	LA	CM	CF	OR	UR	HH A	L LA	HA	LA	CM	CF
Consumes (scanner Tx)	No consumed data															

Where: CF = Channel Fault status; 0 = no error, 1 = fault
 CM = Calibration Mode; 0 = normal, 1 = calibration mode
 LA = Low Alarm; 0 = no error, 1 = fault
 HA = High Alarm; 0 = no error, 1 = fault
 LLA = Low/Low Alarm; 0 = no error, 1 = fault
 HHA = High/High Alarm; 0 = no error, 1 = fault
 UR = Underrange; 0 = no error, 1 = fault
 OR = Overrange; 0 = no error, 1 = fault

1734-IT2I Isolated Thermocouple Input Module

Message size: 8 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Input Channel 0 - High Byte								Input Channel 0 - Low Byte							
	Input Channel 1 - High Byte								Input Channel 1 - Low Byte							
	Status Byte for Channel 1								Status Byte for Channel 0							
	OR	UR	HH A	L LA	HA	LA	CM	CF	OR	UR	HH A	L LA	HA	LA	CM	CF
	OR	UR	Cold Junction Temperature (Selectable: Channel 0, Channel 1, or Average of both Channel 0 and 1)													
Consumes (scanner Tx)	No consumed data															

Where: CF = Channel Fault status; 0 = no error, 1 = fault
 CM = Calibration Mode; 0 = normal, 1 = calibration mode
 LA = Low Alarm; 0 = no error, 1 = fault
 HA = High Alarm; 0 = no error, 1 = fault
 LLA = Low/Low Alarm; 0 = no error, 1 = fault
 HHA = High/High Alarm; 0 = no error, 1 = fault
 UR = Underrange; 0 = no error, 1 = fault
 OR = Overrange; 0 = no error, 1 = fault

1734-VHSC 24V dc High Speed Counter Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 0 value of present counter state (LSW)															
	Channel 0 value of present counter state (MSW)															
	PE	EF	NR	0	FS	FS	OS	OS	0	ZS	BS	AS	C1	C0	ZD	0

Where: PE = Programming error
 EF = EEPROM fault status
 NR = Not ready status bit
 FS = Output fault status bit - bit 10 for output 0, bit 11 for output 1
 OS = Output on/off status bit - bit 8 for output 0, bit 9 for output 1
 ZS = Z input status
 BS = B input status
 AS = A input status
 C = Stored data count
 ZD = Zero frequency detected
 LSW = Least significant word
 MSW = Most significant word

1734-VHSC 5V dc High Speed Counter Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 0 value of present counter state (LSW)															
	Channel 0 value of present counter state (MSW)															
	PE	EF	NR	0	FS	FS	OS	OS	0	ZS	BS	AS	C1	C0	ZD	0

Where: PE = Programming error
 EF = EEPROM fault status
 NR = Not ready status bit
 FS = Output fault status bit - bit 10 for output 0, bit 11 for output 1
 OS = Output on/off status bit - bit 8 for output 0, bit 9 for output 1
 ZS = Z input status
 BS = B input status
 AS = A input status
 C = Stored data count
 ZD = Zero frequency detected
 LSW = Least significant word
 MSW = Most significant word

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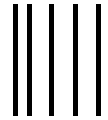
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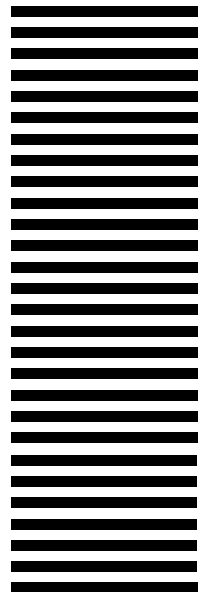
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